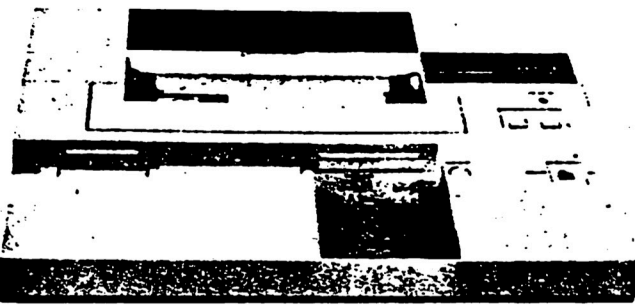# SHARP SERVICE MANUAL

CODE : 0 0 Z C E 1 4 0 P S M / E

MODEL CE-140P

● Printer of ink-dot plotter method and 7 colours
● Use the operation manual with this text

CONTENTS

1. SPECIFICATIONS

Model: CE-140P

Product: Colour Dot Printer

Printing method: X, Y Plotter

Characters/line: Maximum of 80 (smallest character size)

Printing Colours: 7 (Black, Purple, Red, Magenta, Green, Cyan, Yellow)

Ink colours: 4 (Black, Magenta, Cyan, Yellow: EA-600 Ink Cartridge)

Ink lite:
Black:
Approximately 1,600,000 dots (approximately 66,000 standard size "2" characters)
Other colours:
Approximately 960,000 dots (approximately 40,000 standard size "2" characters)
Printed at 20°C (68°F)

Character size: 63 types from 0.8 mm x 1.2 mm to 50.4 mm x 75.6 mm

Character printing directions: 4 (Up, Down, Left, and Right)

Minimum head movement: 0.2 mm

Printing Speed: Maximum of 6.1 characters/second (when the standard size character "2" is printed in black. The printing speed varies depending on the format and character type being printed.)

Paper: Roll paper diameter 25 mm or less, width 114 mm (Option: EA-515P)

Power requirements: Built-in rechargeable battery
AC: Local voltage with EA-150 AC adaptor

Power consumption: 5.2W

Number of lines: Approximately 450 (with 15-hour charge) (At a temperature of approximately 20°C (68°F), standard size "2" characters printed in black, and twenty "5" characters printed per line.

Operating temperature: 5°C to 40°C (41°F to 104°F)

Dimensions: 256(W)x184(D)x43(H)mm 10-25/32"(W)x7-1/4"(D)x1-11/16" (H)

Weight: Approx. 860g (1.9 lbs.)

Accessories: AC Adaptor (EA-150), Hard case, 1 roll of paper, 1 spare ink cartridge, Cleaning kit (1 cleaning cartridge, 1 cleaning paper, 1 cleaning pad), Operation manual.

SHARP CORPORATION

2. SCHEMATIC DIAGRAM OF THE SYSTEM

SIO I/F

CE-515P etc.

CE-152

CE-124

PC-1450, PC-1350
EL-5520
computer

CE-130T

CE-126P

PC-5000
CE-516L

CE-515P

Fig. 1
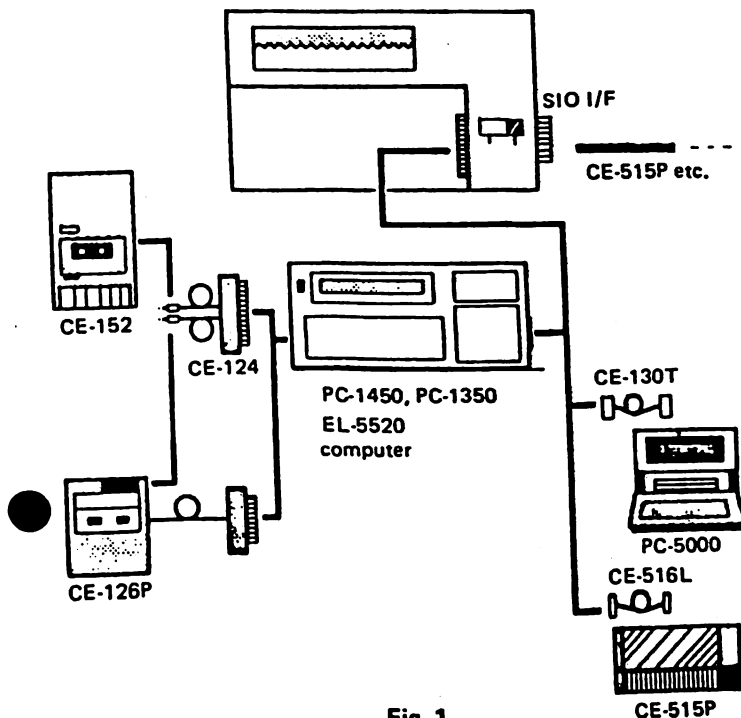
3. NOTES FOR HANDLING THE CE-140P

- How to attach roll paper.
- How to exchange an ink cartridge.
- How to clean a printer head. (How to use a cleaning kit.)
- How to clean a printer. (How to use a cleaning kit.)
- How to connect the CE-140P with a computer.
- Range for moving a head or paper (printing area).
- Instructions for the CE-140P.

As for the items given above, refer to the operation manual.

- **Power supply**

In the CE-140P, a battery of charging type (nickel-cadmium storage battery of hermetic type) is used as a power source.
This battery of charging type supplies the followings:

1. Voltage for operating a printer (voltage for operating a motor or a head): $Vp = 6.0 \pm 0.5V$
2. Logic circuit operation voltage (printer control circuit: $Vcc = 5.0 \pm 0.5V$

However, the power is not supplied from the CE-140P to a computer.

General knowledge of batteries of charging type

- Immediately after purchasing a product, it seldom happens that a battery cannot be used for a prescribed while after charging sufficiently (more than 15 hours). In such a case, the general condition will be returned while it is used after charging 2 or 3 times.
- When a battery is not used for a long while, the battery capacity is lowered by self-discharge.

- If a battery is charged for a while more than the specified time, overcharge occurs, and the battery performance sometimes falls.
- If charging is performed when the temperature is 5°C or less or 40°C or more, than battery performance sometimes falls.
- After repeating several times charge and discharge correctly, if the battery can be used only for half of the prescribed time, consider the life of the battery, and change it.

Reference data

1. Rated values of a battery of charging type

Nominal voltage: 6.0V
Nominal capacity: 500mAh (0.2C discharge)
Charging current: 50mA
Time for charging 15 hours
Trichle charging current: 10~25 mA
Temperature range for reserving:−20°C ~ 40°C (less than 85%)

2. In the temperature range of 25±5°C, no-load terminal voltages after completing charging are given in Table 1. The charging must be performed in the temperature range given above with 50mA for 15 hours.

Time elapsed	No-load terminal voltage	
	MIN	MAX
For an hour or less	6.50V	7.50V
After a Month	6.25V	6.75V

Table 1.

3. Discharge capacity

Charge and discharge are performed at the same temperature, and the final discharge voltage is 5.0V.
Standard charging ...... Charging is performed with 50mA for 15 hours, discharge is performed with 100mA steady current.

1) Discharge capacity after charging

The discharge capacity within an hour after completing charging is given in Table 2.

Charge or discharge temperature	Discharge capacity
10 ± 2°C	500mA or more
20 ± 2°C	500 mA or more
35 ± 2°C	400 mA or more

Table 2.

2) Capacity after leaving batteries

After completing charging, if a battery is left for a month at the temperature of 20±2°C, the discharge capacity is 300MAh or more.

4. Characteristics of the charging voltage

Charging voltage after charging continuously with 50mA steady current of 15 ours are given in Table 3.

Temperature	Charging voltage
0°C	More than 7.5V
20°C	More than 7.2V
40°C	More than 7.0V

Table 3.

4. CE-140P CIRCUIT BLOCK DIAGRAM
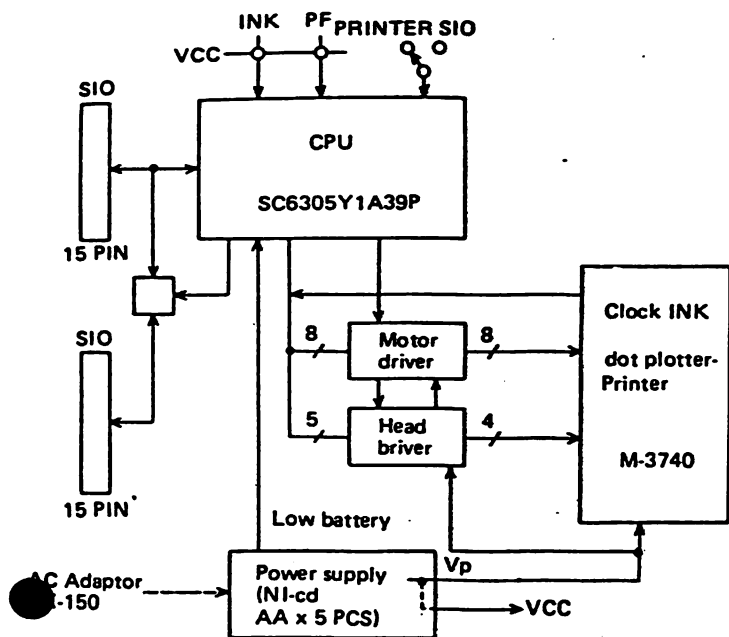

Fig. 2

5. EXPLANATION OF CIRCUIT OPERATION

1. Power supply circuit

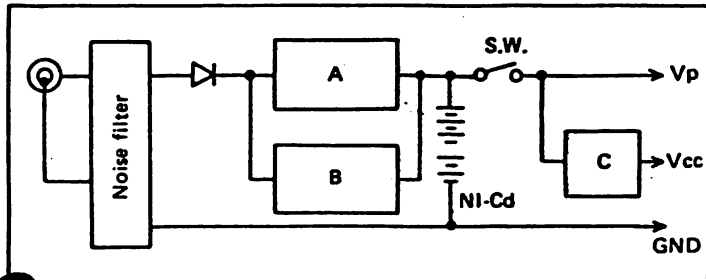Fig. 3 shows the block diagram of a power supply circuit.

Fig. 3

Since the printer operation voltage is the same as that of the Ni-cd discharge voltage, the Ni-cd terminal voltage Vp is connected directly.

Section A: When the capacity of a Ni-cd battery is small, (when the low-battery is not detected), the voltage same as the battery voltage is directed from the adapter to suppress bettery consumption.

Section B: This is a circuit used exclusively for charging a Ni-cd battery.

Section C: This is a Vcc power supply circuit used for a logic circuit (printer control circuit).

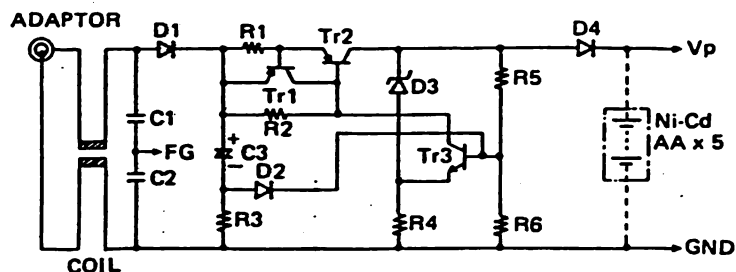● Section A: Power supply circuit

Fig. 4 Circuit section A in the block diagram

1) This is a control circuit in which the output current of the AC adapter is controlled not to exceed max. 500mA using the R1 and Tr1.
   C3, R3 and D2 are used to rise the power supply circuit by flowing base current (D3→D2→Tr3→R4) on the Tr3 when the AC adapter is connected.

2) When the Ni-cd terminal voltage is 6.0V or more, this circuit is scarcely operated.

3) When the battery capacity is small, if a printer is operated, this circuit is operated full toward detecting low battery (5.3V). That is; when the battery voltage is lowered to 5.5V by printer operation, the electric potential in the cathode side (Tr3 collector) of the zener diode D3 is also lowered, and the emitter electric potential of Tr3 is more lowered (get near to GND level) on account of constant-voltage effect of the zener diode D3. Accordingly, the increase of the collector current of Tr3 causes the increase of the current of the collector and the emitter of Tr2. Therefore, current supply is passible when the battery capacity is small.

4) When the supply current is increased and the AC adapter output current is 500mA or more, Tr1 cut-off electric potential is exceeded (R1 x 500mA), and Tr1 is ON—Tr2 is OFF, so that the current supply is stopped.

● Section B: Power supply circuit
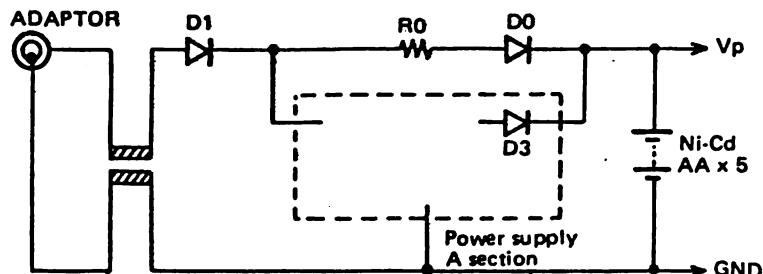
Fig. 5 Circuit section B in the block diagram

1) This is a circuit used to charge Ni-cd battery by flowing approx. 50 mA on RO when a printer is not operated.

2) Charging current varies depending on the status of Ni-cd battery capacity (terminal voltage). The range of the variation is given below.

Ni-cd terminal voltage	Approx. 6.5V (initial stage of charging)	Approx. 7.5V (Typ.)	Approx. 7.75V (last stage of charging)
Charging current	About 117mA	About 51mA	About 5.3mA

CE-140P

- **Section C: Vcc power supply circuit**
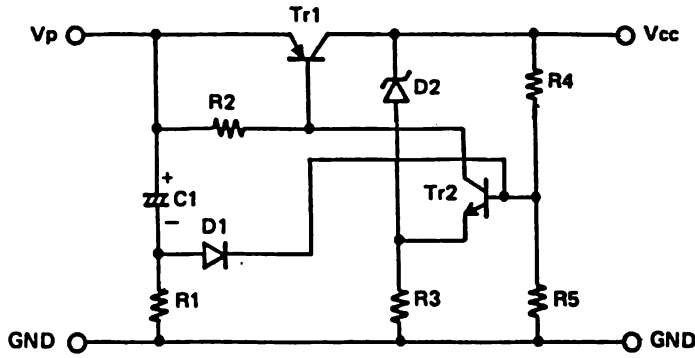
Fig. 6 Circuit section C in the block diagram

The logic voltage Vcc is generated with Vp voltage. Since the Vp varies from 5.5V to 6.5V when a printer is operated and varies from 6.5V to 7.7V while charging, the zener charactristics are used. The stabilization of activation at starting time is accomplished with C1, R1 and D1 which have the same charactristics as the of C1, R1 and D1 in circuit A.

6. EXPLANATION OF CPU TERMINAL SIGNALS

- SC6305Y1 is a single chip micro computer of 8 bits.
  (Internal ROM = 7872 bits, RAM = 256 bytes, extension of an external 8K byte RAM is possible.)

| Terminal No.	Terminal name	Input/Output	Explanation of signals
1	Vss	Power supply	0V
2	RES	Input	Power ON reset input terminal
3	INT	Input	Interruption input terminal when a low battery is detected. (In general, high level, when LB is detected, low level)
4	STBY	Input	Pull-up and fix to Vcc.
5	XTAL	Input	4 MHz oscillator connection terminal
6	EXTAL	Input	4 MHz oscillator connection terminal
7	NUM	Input	Pull-up to Vcc at 10 KΩ.
8	TIMER	Input	Fix to GND = 0V.
9	PA7	Output	Paper feed (Y) motor D phase start signal
10	PA6	Output	Paper feed (Y) motor C phase start signal
11	PA5	Output	Paper feed (Y) motor B phase start signal
12	PA4	Output	Paper feed (Y) motor A phase start signal
13	PA3	Output	Carriage feed (X) motor D phase start signal
14	PA2	Output	Carriage feed (X) motor C phase start signal
15	PA1	Output	Carriage feed (X) motor B phase start signal
16	PA0	Output	Carriage feed (X) motor A phase start signal
17	PB7	Output	SID "RD" signal
18	PB6	Output	SIO "CS" signal
19	PB5	Output	PRINT ↔ external SIO select signal (buffer IC enable signal)
20	PB4	Output	Print signal, when the head drive signal is generated, low level.
21	PB3	Output	Head pin drive (yellow) signal, high level is available.
22	PB2	Output	Head pin drive signal (mazarine) signal, high level is avilable.
23	PB1	Output	Head pin drive signal (cyanic) signal, high level is available.
24	PB0	Output	Head pin drive (black) signal, high level is available.
25	PC7	—	N.C
⌇	⌇	—	⌇
27	PC5	—	N.C
28	PC4	Input	Carriage home position detection signal. Only the home position is at high level.

4

Terminal No.	Terminal name	Input/ Output	Explanation of signals
29	PC3	—	N.C
30	PC2	Output	Low battery detection support signal (when LB is detected, high. Vcc power supply in the motor circuit is stopped.)
31	PC1	Input	Japan types are pulled-up to Vcc at 10KΩ, and Export type is pulled-down to GND at 10KΩ.
32	PC0	Input	PRINTER ⟷ SIO select signal. Printer side = low level, SIO side = high level.
33	Vcc	Power supply	5 ± 0.5V
34	PD1	Input	SIO "SD" input signal
35	PD2	Input	SIO "RS" input signal
36	PD3	Input	SIO "RR" input signal
37	PD4	Input	INK key input signal. Vcc level is set by key ON.
38	PD5	Input	↑ key input signal. Vcc level is set by key ON.
39	INT2	Input	Interruption signal. Low level is available.
40	PD7	Input	PAK (peripheral acknowledge) signal. High effective signal generated with PRQ (peripheral request) signal.
41	A0	Output	N.C
₹	₹	₹	₹
54	A13	Output	N.C
55	R/W̄	Output	N.C
56	E	Output	N.C
57	D7	Input/Output	N.C
₹	₹	₹	₹
64	D0	Input/Output	N.C

7. HOW TO CHECK OPERATIONS

1) Color test function
This is a function to check head stuffing or ink exhaustion. When the form feed key is pressed with pressing the ink exchange key, a square of which side length is 5mm is drawn in the hatching form with each color. The order of colors is as follows:
Black, purple, red, magenta, green, cyan, yellow.
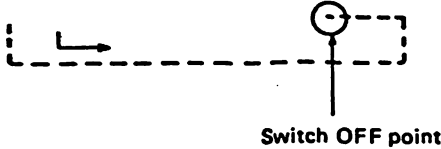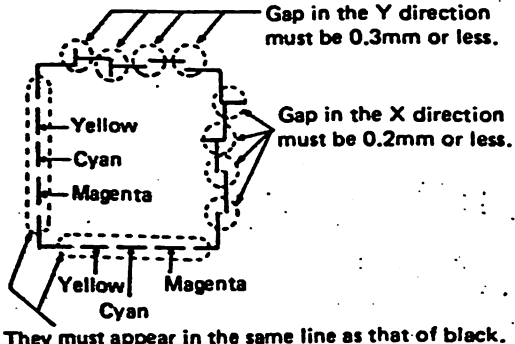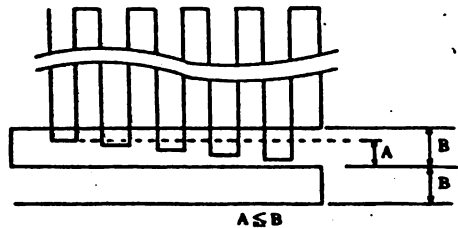
2) Character test function
This is a function to check the print status of characters. Turn on the power supply switch with pressing the paper feed key. Then, printing characters (letters or numerics) contained in this machine is started. When printing characters is completed once, restart printing from the beginning after exchanging ink. (Ink can be exchanged in the order of black → cyan → magenta → yellow.) When printing is to be terminated, turn off the power supply switch.

3) Charcter of printed characters, or checking print precision

- Prepare the PC-1450 (EL-5520) to connect with the CE-140P which is to be tested.
- Enter the ckeck program in the PRO mode, and carry cut the following operation:

CE-140P	PC-1450	Operation	Point to be checked
●		Press INK key and set it free.	Printer head must be in the rightmost position.
●		Press ↑ key.	Paper feed is prohibited.
●		Press INK key and set it free.	Head must be in the leftmost position.
	●	POWER SW ON	
	●	BASIC R · ENTER	
●		When printing progressed up to the position shown below, set the power switch to OFF.	In the display of the PC-1450, "ERRO 8 IN" must appear.
		Switch OFF point	
●	●	Set the power switch to ON. C-CE DEF A	Gap in the Y direction must be 0.3mm or less. Gap in the X direction must be 0.2mm or less. Yellow Cyan Magenta Yellow Magenta Cyan They must appear in the same line as that of black.
			A≤B
			ABCD ..... XYZ0123456789+−*/ (In each color, bolt, stain in the space, blur, or transformation of printed characters is not allowed.)

Do not sale !

Print samples to be tested (some kinds of colors do not appear in print.)

■■■■■

g="#$%&'()*+,-./0123456789:;<=>?@ABCDEFGH
IJKLMNOPQRSTUVWXYZ[¥]^_'abcdefghijklmnop
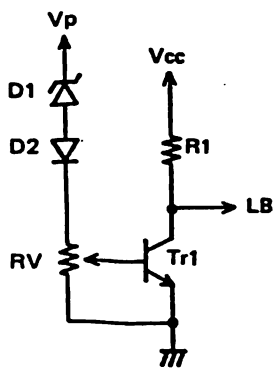qrstuvwxyz{!)~⌐「、。ヲァイウエオャュョッ－アイウエオカキクケコ
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ウエオカキクケコサシスセソタチツテトナニヌネノハヒフヘホマミムメモ]ヨラリルレ
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ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789+-*/
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789+-*/

● Check program

```
10:REM ** TEST for CE140P **
20:CONSOLE 160
100:LPRINT CHR$ 27+"@"
110:REM ** X ERROR ***
120:LPRINT CHR$ 27+"b"
130:LPRINT CHR$ 27+"b"
140:LPRINT "L5": LPRINT "D480,-40,B"
200:"A" REM ** X&Y ERROR **
210:LPRINT CHR$ 27+"b"
220:LPRINT "M100,-100"
230:LPRINT "J25,,,5,,-5,25,,,-5,,5,25,,,
"
240:LPRINT "R,5,,-5": LPRINT "J25,": LPR
INT "R,-5,,5": LPRINT "J25,,,-25"
250:LPRINT "J5,,-5,,,-25,-5,,5,,,-5"
260:LPRINT "R5,,-5,": LPRINT "J,-25": LP
RINT "R-5,,5,"
270:LPRINT "J,-25,-25,"
280:LPRINT CHR$ 27+"C3": LPRINT "J-25,"
290:LPRINT CHR$ 27+"C5": LPRINT "J-25,"
300:LPRINT CHR$ 27+"C6": LPRINT "J-25,"
310:LPRINT CHR$ 27+"C0": LPRINT "J-25,,,
25"
320:LPRINT CHR$ 27+"C3": LPRINT "J,25"
330:LPRINT CHR$ 27+"C5": LPRINT "J,25"
340:LPRINT CHR$ 27+"C6": LPRINT "J,25"
350:LPRINT CHR$ 27+"C0": LPRINT "J,25"
360:LPRINT "R-100,-225"
400:REM ** Y RUISEKI **
410:LPRINT CHR$ 27+"C0": LPRINT "R100,"
420:FOR A=0 TO 4: LPRINT "J,-999,10,,,99
9,10,": NEXT A
430:LPRINT "J,-996"
440:LPRINT CHR$ 27+"C3"
450:LPRINT "J-150,,,-3,150,,,-3,-150,"
460:LPRINT "R-50,-200"
500:REM ** CHARACTER **
510:LPRINT "A"
520:FOR A=0 TO 5: LPRINT CHR$ 27+"C";CHR
$ (48+A);
530:LPRINT "ABCDEFGHIJKLMNOPQRSTUVWXYZ01
23456789+-*/"
540:NEXT A
600:LPRINT CHR$ 10;CHR$ 10;CHR$ 10;CHR$
10;CHR$ 10;CHR$ 10;CHR$ 10
610:END
```

8. ADJUSTMENT IN THE CIRCUIT

1) How to adjust voltages in the low battery detection circuit.

Adjust the RV(220KΩ) to correspond to the measured ambient temperature so that the low battery may be detected at the Vp voltages given in the following table. (Set VR in the full clockwise direction, then, adjust by slowly rotating leftward.)

Ambient temperature (°C)	Vp(V)	LB(V)
0	5.49±0.01	1.0±0.1
5	5.45±0.01	1.0±0.1
10	5.41±0.01	1.0±0.1
15	5.38±0.01	1.0±0.1
20	5.34±0.01	1.0±0.1
25	5.30±0.01	1.0±0.1
30	5.26±0.01	1.0±0.1
35	5.23±0.01	1.0±0.1
40	5.19±0.01	1.0±0.1

2) How to adju
Adjust a pulse
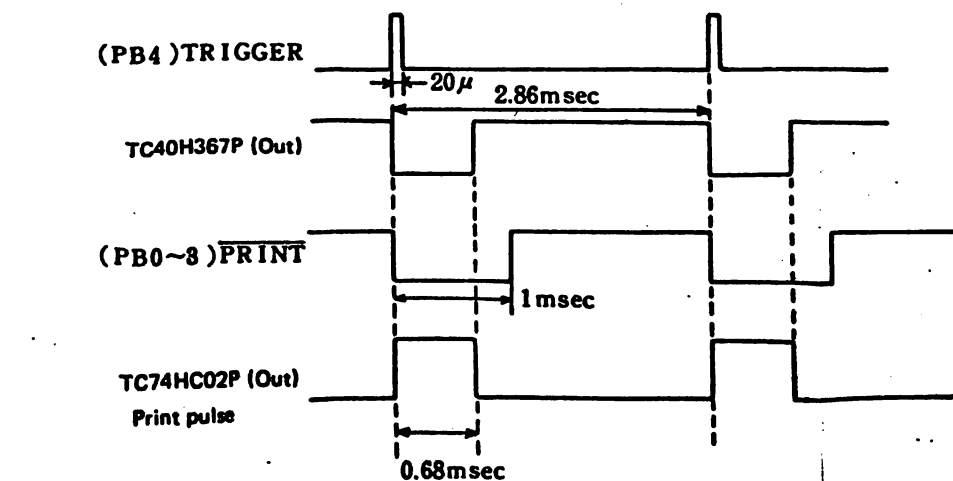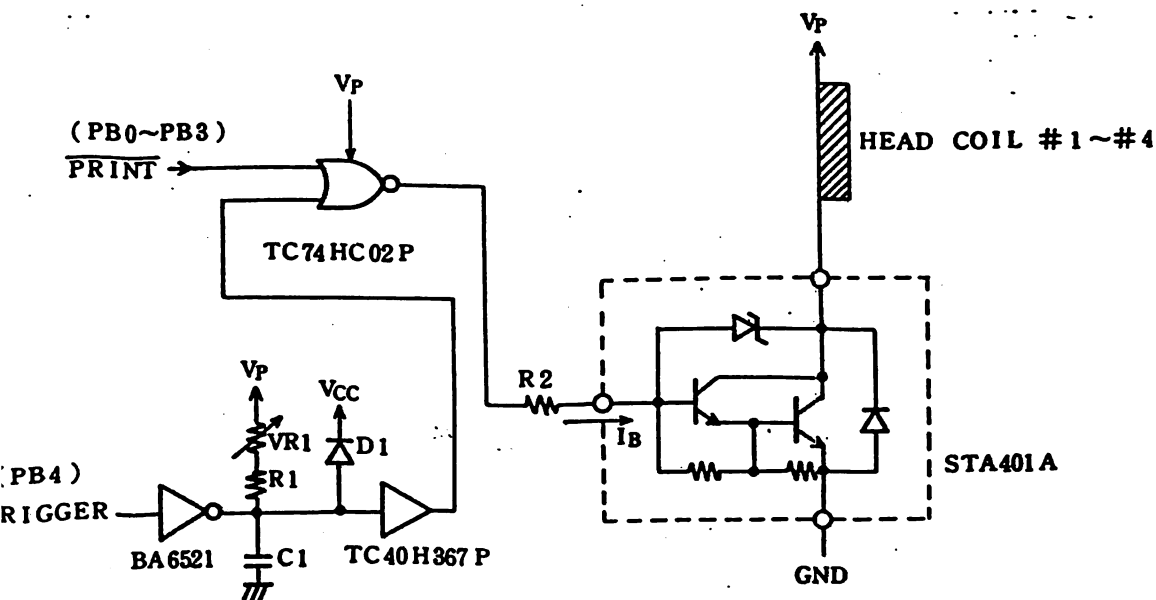C terminal of t
when the Vp vo

3. CIRCUIT DIAGRAM

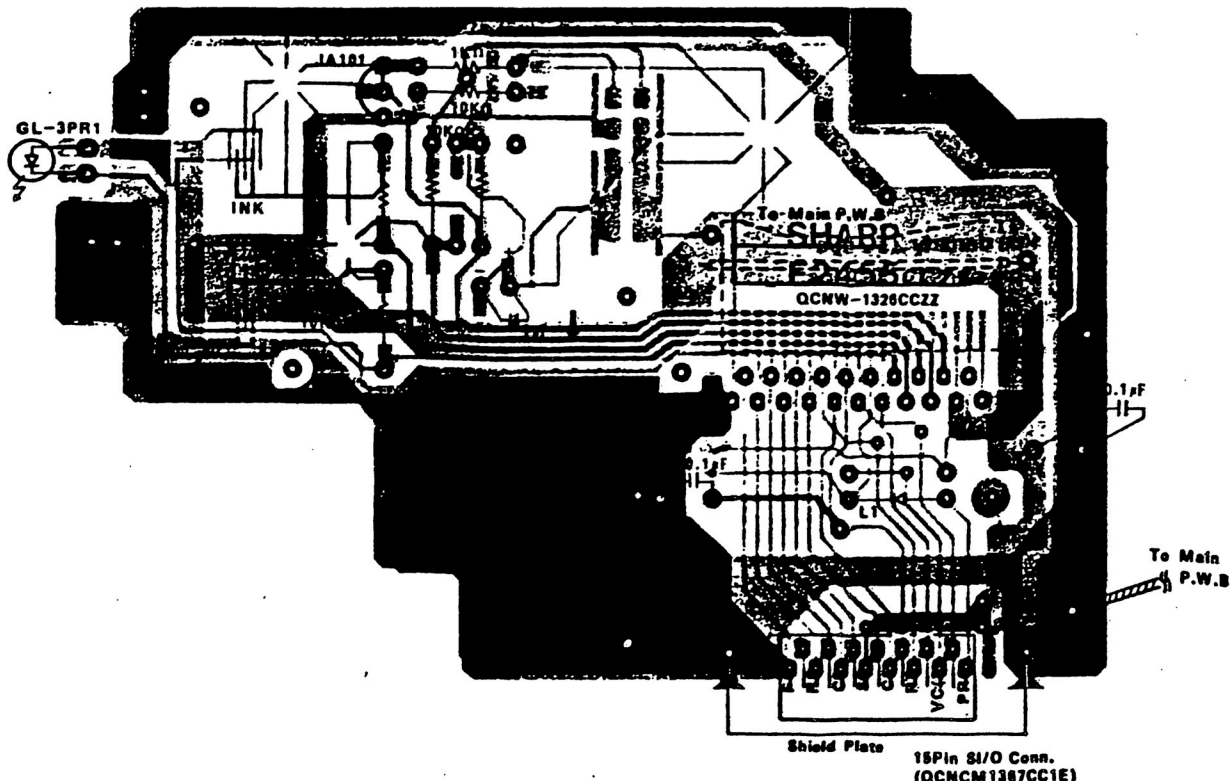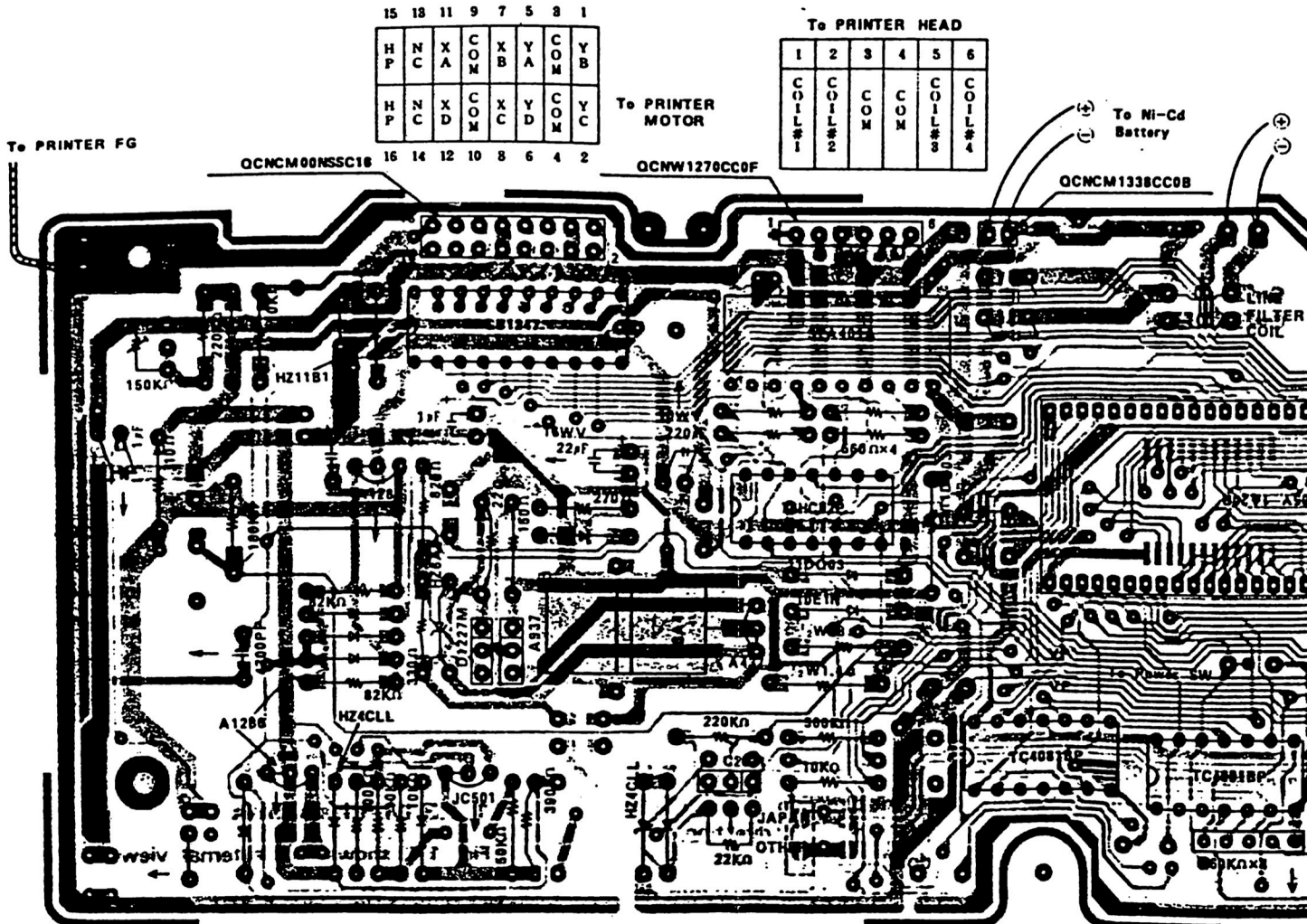
Fig. 7

st a head drive circuit (print pulse width)
width (printer head coil applying pulse, and
he STA401A) to be 0.68m sec. using VR1
ltage is within 6.0 ±0.05V.

(PB0~PB3)
$\overline{PRINT}$ →

V_P

TC74HC02P

V_P V_{CC}
    VR1   D1
    R1

(PB4)
TRIGGER

BA6521 $\equiv$C1   TC40H367P

R2
→ I_B

HEAD COIL #1~#4

STA401A

GND

(PB4)TRIGGER

20μ   2.86msec

TC40H367P (Out)

(PB0~3)$\overline{PRINT}$

1msec

TC74HC02P (Out)
Print pulse

0.68msec

〈Fig− 8 〉

− 8 −

CE-140P

9. CIRCUIT DIAGRAM

KEY PWB

FG
SD
RD
RS
CS
DR
SG
CD
CI
VC(1)
RR
PAK
VC(2)
ER
PRO

SC6305Y1A39P

4MHz

30p×2

Y1
Y2

ADAPTOR

560K
BLOCK R.
(1/4)

TC40H367P (3/6)

TC40H367P

EX.SI/O

FG
SD
RD
RS
CS
DR
SG
CD
CI
VC(1)
RR
(NC)
VC(2)
ER
(NC)

100K BLOCK R. (3/4)

FG

960K BLOCK R. (3/4)

(TC4011BPF
  TC40H004PP)

KEY PWR

TC4001BP(1/4)

TC4081BP(1/4)

100K
BLOCK R
(3/4)

INK

PF

JA101
P,Q

PRTo SIO

TC4001BP
(1/4)

100K
BLOCK R
(1/4)

TC4081BP
(1/4)

50WV 1p

TC40H367P(1/6)

Printer
M-3740

HZ11B1

2SA1206

LB1247

J

EX

Ni-Cd

STA401A

TC74HC02P

KEY PWR

TC40H367P (1/6)

6) As for parts appecded with ■ marks, only patterns are attached. select

5) Resistances of items with * marks are 100KΩ 5 elements compound resistances.

4) —▷o— is BA6251

3) Diodes with no indication are DS1588L1.

2) Condensers with no indication are laminated ceramic condensers of 50WV 0.1 μF.

Note: 1) Resistances with no indication are 1/4 W carbon resistance.

PARTS & SIGNAL POSITION

15	13	11	9	7	5	3	1
H P	N C	X A	C O M	X B	Y A	C O M	Y B
H P	N C	X D	C O M	X C	Y D	C O M	Y C
16	14	12	10	8	6	4	2

To PRINTER MOTOR

QCNCM00NSSC16

To PRINTER HEAD

1	2	3	4	5	6
C O I L #1	C O I L #2	C O M	C O M	C O I L #3	C O I L #4

QCNW1270CC0F

To Ni-Cd Battery

QCNCM1338CC0B

To PRINTER FG

GL-3PR1

To Main P.W.B

SHARP

QCNW-1326CCZZ

To Main P.W.B

Shield Plate

15Pin SI/O Conn.
(QCNCM1367CC1E)

R1 28KΩ
R2 100KΩ

—10—

To ADAPTOR
JACK

QCNCW1368CC1E

1	FG
2	SD
3	RD
4	RS
5	CS
6	DR
7	SG
8	CD
9	CI
10	VC(1)
11	RR
12	(NC)
13	VC(2)
14	ER
15	(NC)

To KEY PWB

QCNW–1326CCZZ

1	2	3	4	5	6	7	8	9	10
E	B	C	B	C	B	C	B	C	E

STA–401A

OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7 N.C

IN1 IN2 IN3 IN4 IN5 IN6 IN7 GND

R3 R5 R7 R9 R11 R13
R4 R6 R8 R10 R12 R14

BA–6251

N·C

■ PRINTER SECTION

1.1 GENERAL DESCRIPTION

1.1.1 Features

The Ink Dot Printer Model-3740 has been developed and designed for use with a personal computer. It offers the following features.
- Simple design and highly reliable mechanisms
- Ultra-compact and lightweight
- High-speed, sharp printing in seven colors
- Selection of vector or bit-image printing
- Easy one-step replacement of the ink cartridges

1.1.2 Specifications

Specification in this section deals with the printer unit (KI-OB1025CC) only. It does not contain interface and drive circuit requirements for the CE-140P.

1) Printing Method:
Ink dot printing method

2) Printing Formats:
Vector Printing (including character printing)

Column width	: 40 columns (9 x 13 matrix, 1 space = 3 dots)
Printing speed	: 8.1 cps average (standard characters)
Plotting range	: X-axis direction 96.0 mm (Head-scanning direction, 481 dots) Y-axis direction 200.0 mm (Paper-scanning direction, 1001 dots)
Plotting speed	: X- or Y-axis directions 70 mm/s At 45° angle 100 mm/s (maximum)

Bit-Image Printing

Plotting range	: Single density 241 dots/line (X, Y, 0.4 mm) Double density 481 dots/line (X, Y, 0.2 mm)
Plotting speed	: Single density 250 dps Double density 500 dps

3) Paper (Roll Paper)

Paper quality	: Form paper EA-515P

4) Recording Head

Voltage applied to driver	: 6 VDC ± 0.5 VDC
No. of wires	: 4 wires (1 wire each for black, yellow, magenta, and cyan)

5) Inking

Ink cartridge	: Black, Yellow, Magenta, Cyan EA-600
Ink life	: Black approx. 1.6 million dots (equivalent to 66,000 standard characters) Yellow, Magenta, Cyan (Approx. 0.96 million dots each) (equivalent to 40,000 standard characters)

6) Motor

Motor type	: PM-type stepping motor Four-phase, 20 steps
Voltage applied to driver	: 6 VDC ± 0.5 VDC

7) Reset Detector

Type	: Mechanical junction

8) Connection Method

Motor, Reset detector	: Connector
Head	: F.P.C.

9) Environmental Condition

Operating temperature	: 5°C to 40°C (41°F to 104°F)

10) Reliability

Mechanical life	: 1 billion steps (equivalent to 25 million characters)
Head life	: 75 million dots/wire (equivalent 3 million characters/wire)

11) External Dimensions
202 (W) x 64 (D) x 28 (H) mm

12) Weight
Approx. 250 g.

1.1.3 Mechanisms

Fig. 1-1 shows the external view of Ink Dot Printer Model-3740, which consists of four mechanisms: paper feeding mechanism, carriage feeding mechanism, head mechanism, and reset detector.
See section 1.2, "OPERATING PRINCIPLES" for description of the respective operating principles.
- Paper feeding mechanism
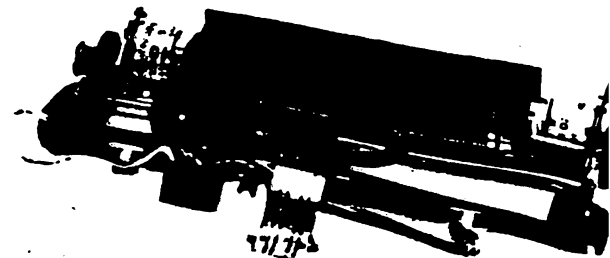- Carriage feeding mechanism
- Head mechanism
- Reset detector mechanism

Fig. 1-1. External View of Model-3740

1.2 OPERATING PRINCIPLES

1.2.1 Plotting Principle

As shown in Fig. 1-2, the vertical direction of the paper is regarded as the Y-axis direction, and its horizontal direction as the X-axis direction. Paper is fed by the paper feeding mechanism of Model-3740 along the Y-axis direction; the built-in dot head of the carriage is moved by the carriage feeding mechanism along the X-axis direction. These two types of movements plus the wire control of the dot head on the carriage enable plotting and printing to be performed.
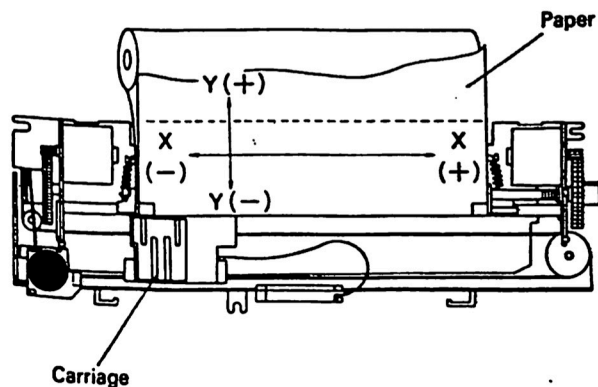
Fig. 1-2. Orientation of Paper and Carriage

1.2.2 Paper Feeding Mechanism

1) Configuration
This mechanism consists mainly of the paper feeding motor, paper feeding gear ass'y, platen unit, paper holding lever, paper holding roller, and paper guide.

2) Remarks
Paper feed is performed by friction between the paper holding roller and platen unit (i.e., contact between the paper and the paper feeding claw).
The amount of paper feed is determined by setting the outer diameter of the platen and related parts so that paper is fed 0.2 mm per one step of the motor. To prevent backlash at such time (during forward or backward rotation of the motor), the paper feeding gear is provided with a two-gear configuration as shown in Fig. 1-3.
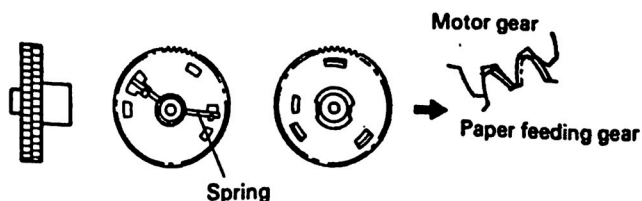The paper feeding claw functions to prevent slippage of the paper while it is being fed forward or backward.

Fig. 1-3. Two-Body Configuration of Paper Feeding Gear

3) Operating Principle
The peper is set so that it is caught between the platen and the paper holding roller. At this time, driving the paper feeding motor causes the platen unit coupled to the paper feeding gear ass'y to rotate in the arrow direction (←) shown in Fig. 1-4. The paper is then fed in the positive Y-axis direction (←) by pressure from the paper holding roller and being caught on the paper feeding claw.
To reverse-feed the paper in the negative Y-axis direction (⇔), the motor is rotated in the opposite direction. Since the paper is normally in a released position, it can be pulled manually forward or backward in the standby mode.
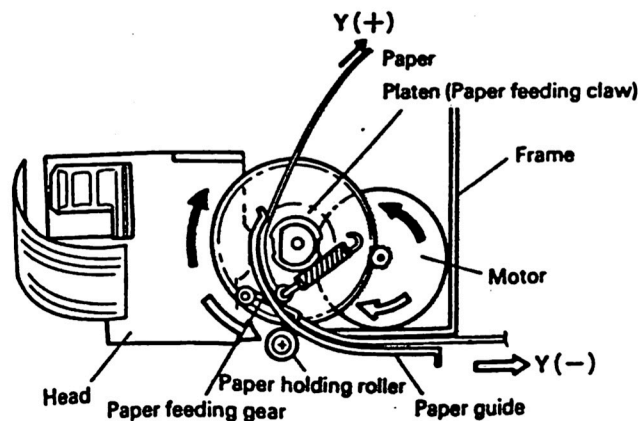

Fig. 1-4. Paper Feeding Mechanism

1.2.3 Carriage Feeding Mechanism

1) Configuration
This mechanism consists mainly of the carriage motor, tension unit, wire drum ass'y, wire, carriage unit, pulleys, and guide shaft.

2) Remarks
The carriage is fed by the winding of the wire onto the wire drum and is controlled by the direction and amount of take-up. The amount of carriage feed is determined by setting the outer diameter of the wire drum and related parts so that the carriage is fed 0.2 mm per one step of the motor.
Similar to the paper feeding mechanism, the speed-up/down gear section of the wire drum assy is provided with a two-gear configuration to prevent backlash during forward or backward rotation of the carriage motor.

3) Operating Principle
The carriage has a built-in dot head and the bottom surface of the carriage is in contact with the guide shaft. Driving the carriage motor causes the wire drum assy to take up the wire in the arrow direction shown in Fig. 1-5 so that the carriage is moved in the negative x-axis direction (←). To reverse the carriage movement in the negative X-axis direction (⇔), the motor is rotated in the opposite direction.
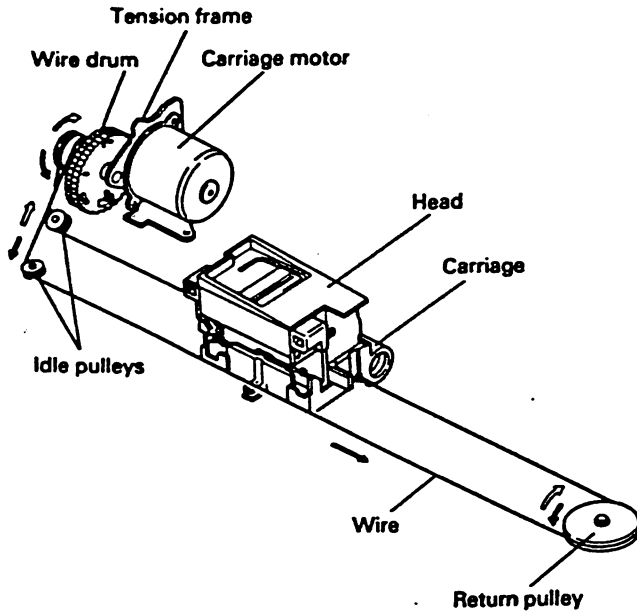
-12-

Do not sale !

Tension frame

Wire drum   Carriage motor

Head

Carriage

Idle pulleys

Wire

Return pulley

Fig. 1-5. Carriage Feeding Mechanism

1.2.4 Reset Detector Mechanism

1) Configuration
This mechanism consists of the reset detector unit.

2) Remarks
The reset detector is a mechanical switch that functions to generate a standard signal for recognizing the reset position of the head, thereby prescribing the home position of the head as well as the printing range. (Fig. 1-6 shows the structure of the reset detector.)
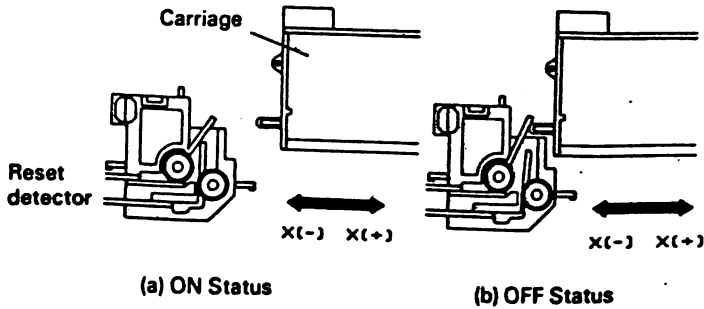
Carriage

Reset
detector

$X(-)$ $X(+)$ $X(-)$ $X(+)$

(a) ON Status   (b) OFF Status

Fig. 1-6. Structure of Reset Detector

3) Operating Principle
If the Reset signal is ON when the printer is powered, the carriage motor rotates in the counter-clockwise direction as viewed from the output shaft side, the wire is wound, and the head moves to its home position.

If the Reset signal is OFF when the printer is powered, the carriage motor moves in the clockwise direction, moves next in the reverse direction after the Reset signal is set to ON, then after the Reset signal is again set to OFF, it moves four steps and recognizes the home position. (Fig. 1-7 shows the reset position of the head.)
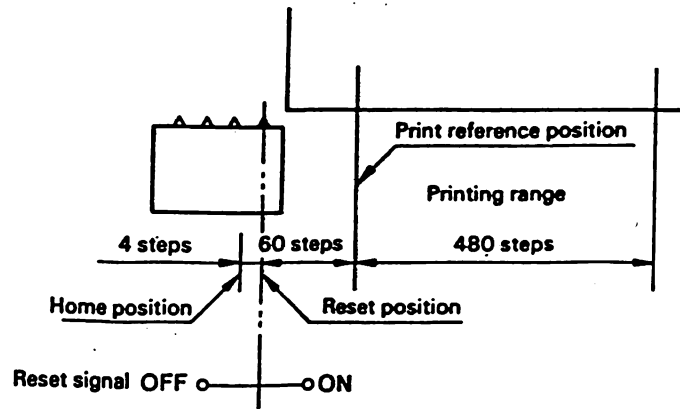
Print reference position

Printing range

4 steps   60 steps   480 steps

Home position   Reset position

Reset signal OFF o————o ON

Fig. 1-7. Reset Position of Head

1.2.5 Head Mechanism

1) Configuration
This mechanism consists of the head unit and ink cartridge unit.

2) Remarks
Printing and plotting is performed by transferring the ink adhered to the tip of the dot wire to the paper.

3) Operating Principle
Dot wire Operation
When current flows through the wire driving coil, the working plate is pulled to the wire driving coil. At the time, the resulting contact between the working plate and dot wire causes the dot wire to be projected towards the platen in the arrow direction shown in Fig. 1-8. The projected dot wire then contacts the platen through the paper, thus completing the printing of one dot. When the wire driving coil is no longer being charged, the working plate and dot wire are returned to their original positions by the fulcrum spring and wire return spring.
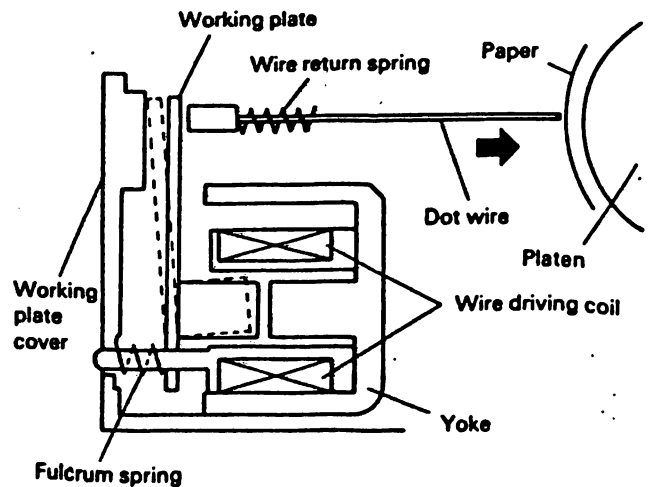
Working plate

Wire return spring   Paper

Working
plate
cover

Dot wire

Platen

Wire driving coil

Yoke

Fulcrum spring

Fig. 1-8. Dot Wire Operation

CE-140P

Ink Colors and Supply

Besides black, the ink comes in the three primary colors of yellow, magenta, and cyan. These primary colors are each printed as single colors. By overlapped printing of any two primary colors, a total of seven colors can be printed as shown in Fig. 1-9.
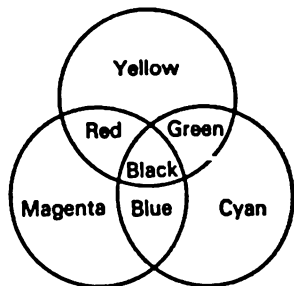

Fig. 1-9. Possible Ink Color Combinations

Ink supply is performed by ink cartridges. The ink cartridge unit is positioned at the top of the dot head, permitting the supply of ink via the ink supply guide. Figs. 1-10 and 1-11 show the exterior view of the head mechanism and a cross-section view of the ink supply operation.
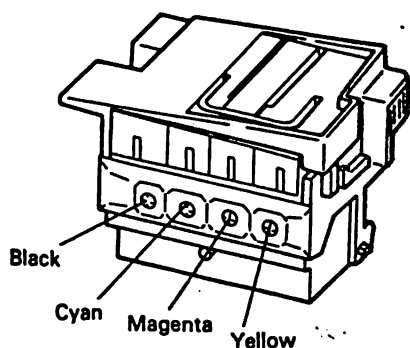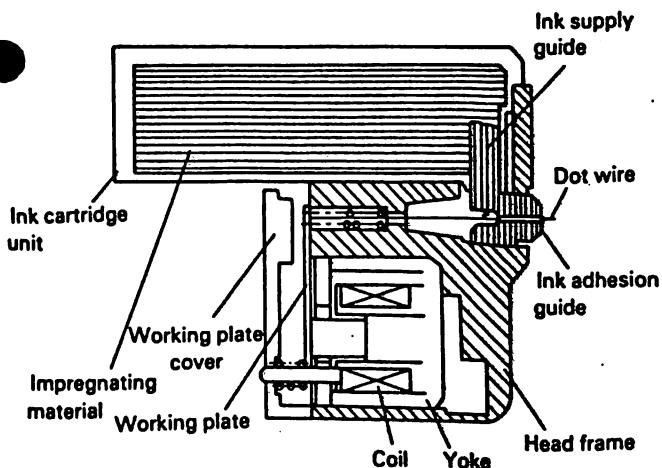

Fig. 1-10. External View of Head Mechanism

Fig. 1-11. Cross-Section View of Ink Supply Operation

Moreover, by applying capillary power to the ink as shown in Fig. 1-12, the liquid surface remains constant to assure a fixed density of the printing surface. (Fig. 1-13 shows the status of the liquid surface during printing.)
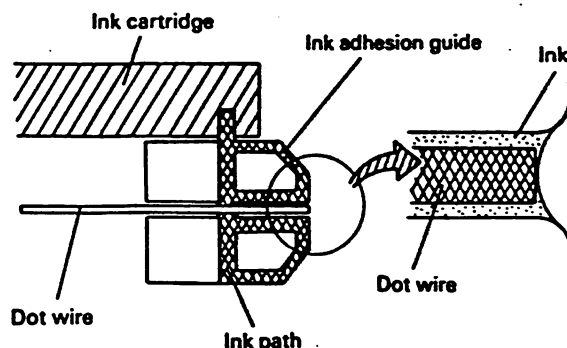

Fig. 1-12. Capillary Action on Ink
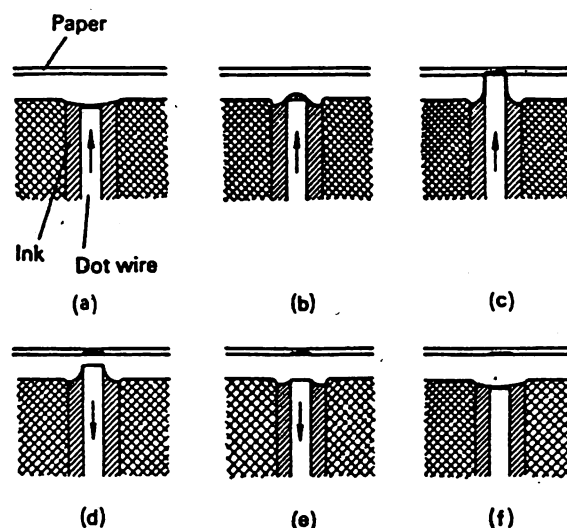
Fig. 1-13. Liquid Surface Status of Ink During Printing

1.2.6 Printing Operation

1) Initialization

In order to confirm that the printer is in the standby status, initialization must be performed prior to printing or plotting. Initialization is automatically executed at the time the printer is powered.

2) Printing Range

As shown in Fig. 1-14, wires #2 (cyan), #3 (magenta), and #4 (yellow) are arranged along the X-axis direction (head-scanning direction) with respect to wire #1 (black), and 24 steps of the motor are arranged along the Y-axis direction (paper-scanning direction) with a two-step offset.

−14−

Do not sale !

#1 Black
#2 Cyan
#3 Magenta
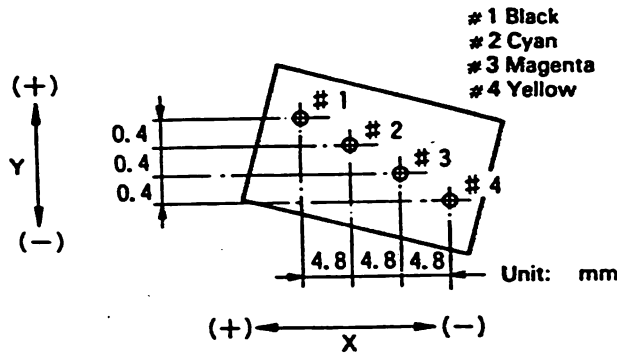#4 Yellow

Unit: mm

Fig. 1-14. Arrangement of Dot Wires

Fig. 1-15 shows the range of the Print Driving signal for each wire, where the print reference position of the head is represented as P(0) and the head position as P(n).
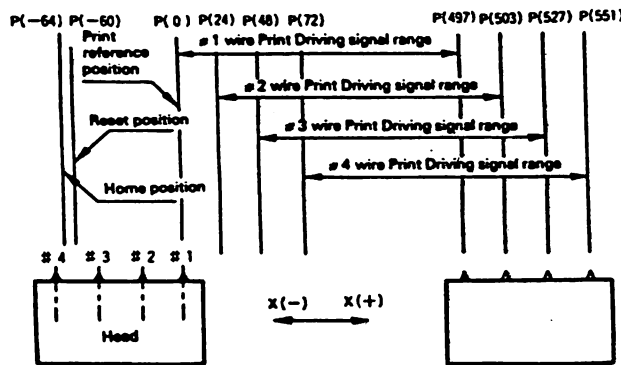

Fig. 1-15. Print Driving Signal Range of Each Wire

Consequently, this offset is considered in cases where #4 wire is printed onto the same position as the #1 wire, requiring that the carriage be fed 72 steps in the positive X-axis direction and that the paper be fed six steps in the negative Y-axis direction.

3) Vector Printing

In the case of vector printing, plotting is started after pulling the paper out for a continuous plotting operation within the y-axis plotting range. After moving the paper and carriage (dot head) to arbitrary position by the forward or reverse rotation of the paper feeding and carriage motors, the head coil of the desired color is charged. The configuration of characters or the plotter mode is then executed using the method described below.

4) Bit Image Printing

In the case of bit image printing, the carriage motor is accelerated or decelerated in order to increase printing speed.

That is, when bit image printing where the head positic moves from $P_{(N)}$ to $P_{(M)}$ is to be performed, the carriag motor is accelerated for the 10-step acceleration ran from $P_{(N-10)}$ to $P_{(N)}$, the carriage motor is driven 500 pp from $P_{(N)}$ to $P_{(M)}$, thereby executing bit image printing. Th 10 steps of the head position from $P_{(M)}$ to $P_{(M+10)}$ is a plied to the paper feed as a deceleration range (see Fi 1-16.):

The carriage motor is stopped after $P_{(M+10)}$, then the pap feeding motor is driven for 250 pps. For single densit the paper is fed two steps; for double density, it is fed or step.
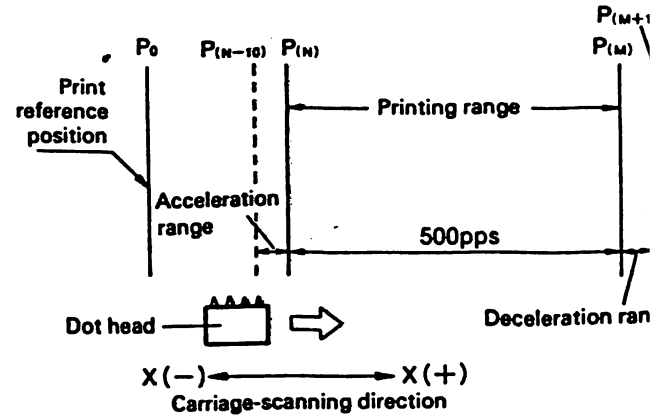

Fig. 1-16. Bit Image Printing Operation

NOTE:
For normal paper feed, the drive frequency of the pap feeding motor is set to 250 pps. In the vector print mod the drive frequencies of the paper feeding motor and ca riage motor are 350 pps.

2.1 REPAIR

The repair procedures are categorized into three levels (A,B,C), as described in the following subsection. Service personnel are requested to work at the repair levels corresponding to his/her own level of technical expertise.

2.1.1 Repair Levels

Descriptions of the three repairs levels are as follows:

LEVEL A:
Requires general knowledge of the operating principles and structure of the printer as well as some servicing skill. At LEVEL A, repair experience or advanced skill is unnecessary.

LEVEL B:
Requires a good knowledge of the operating principles and structure of the printer as well as the ability to disassemble and assemble it. At LEVEL B, repair experience is essential.

LEVEL C:
Requires expert knowledge of the operating principles and structure of the printer as well as the ability to disassemble and assemble it. At LEVEL C, long experience and advanced skill in repair procedures is essential.

2.1.2 Repair Procedures

When a problem occurs, carefully check its symptoms and status, isolate its cause by checking the check-points listed in the tables of subsection 2.1.3, "Guide to Troubleshooting," then perform the necessary remedial measures. For efficient troubleshooting, the tables of the "Guide to Troubleshooting" are organized into the following categories to allow quick reference.

1) Symptom
- Defective head unit operation   17 page
- Defective paper feeding   17 page
- No printing is performed   17 page
- Head unit does not stop at home position   18 page
- A specific color is not printed   18 page
- Missing dots   18 page
- Imperfectly formed characters   18 page
- Running together of ink colors   19 page
- Ink stains on paper   19 page

2) Status
Check the status of the trouble with the contents of this column.

3) Cause
Check the origin of the trouble on the basis of its symptom and status. Refer also to the repair level positioned next to each cause.
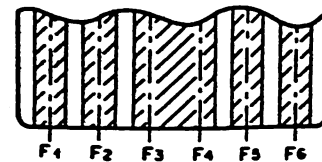
4) Check Point and Method
To isolate the cause of the trouble, follow the instructions in this column, which list the origin of the trouble as well as the method for checking it.

5) Repair Method
Follow the instructions in this column for remedying the trouble. If the symptom or status prior to repair persist after repair is done, troubleshoot the another item in the "CAUSE" column then perform the required repair.

NOTE: To simplify the checking process during troubleshooting and repair, refer to Figs. 2-8 and 2-9 which respectively show pin assignment diagrams of the FPC and the connector.

Pin Assignment

Head coil #1 (Black)	F1
Head coil #2 (Cyan)	F2
Head coil Common lead	F3
Head coil Common lead	F4
Head coil #3 (Magenta)	F5
Head coil #4 (Yellow)	F6
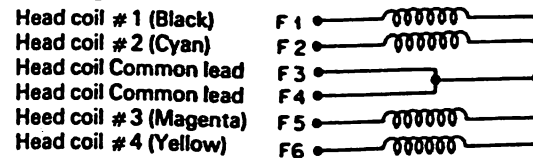
Fig. 2-8. Pin Assignment of the FPC

Connection   **Connector Pin No.**

Paper feeding motor	Phase B	1
Paper feeding motor	Phase C	2
Paper feeding motor	Common lead	3
Paper feeding motor	Common lead	4
Paper feeding motor	Phase A	5
Paper feeding motor	Phase D	6
Carriage motor	Phase B	7
Carriage motor	Phase C	8
Carriage motor	Common lead	9
Carriage motor	Common lead	10
Carriage motor	Phase A	11
Carriage motor	Phase D	12
		13
		14
Reset detector		15
Reset detector		16

Fig. 2-9. Pin Assignment of the Connector

Do not sale !

2.1.3 Guide to Troubleshooting

1) SYMPTOM: Defective head unit operation

STATUS: The printer power is ON but the head unit does not operate.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. A lead of the carriage motor ass'y is broken or the conductivity to the connection section is faulty.	A	● Referring to Fig. 2-9 (Page 16), check both the power terminals of the carriage motor and the conductivity to the connector section.	● Replace the carriage motor.
2. The wire has become loose.	C	● Check that the wire is properly mounted on both the wire mounting section of the carriage unit and the pulleys of the frame.	● Remount the wire or replace the wire drum ass'y.
3. The power supply input to the carriage motor is faulty.	B	● Referring to Fig. 2-9 (Page 16), check the input voltage between the power terminals of the carriage motor.	● Check the input side of the power supply side, then perform repair.
4. The carriage motor is defective.	B	● CAUSE 1 to 3 have been checked, but none pertain to the trouble.	● Replace the carriage motor.

2) SYMPTOM: Defective paper feeding

STATUS: No paper feeding is performed or the line spacing operation is faulty.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. A lead of the paper feeding motor is broken or the conductivity to the connector section is faulty.	A	● Referring to Fig. 2-9 (Page 16), check both the power terminals of the paper feeding motor and the conductivity to the connector section.	● Replace the paper feeding motor.
2. The power supply input to the paper feeding motor is faulty.	B	● Referring to Fig. 2-9 (Page 16), check the input voltage between the power terminals of the paper feeding motor.	● Check the input side of the power supply, then perform repair.
3. A foreign article has entered the paper guide path, platen, paper holding roller or other part.	B	● Check the area around the paper guide path and platen.	● Remove the foreign article.
4. The paper feeding claw is worn or damaged.	C	● Check the status of the tip of the paper feeding claw.	● Replace the platen unit.
5. The paper holding spring is weak.	B	● Perform a visual check of the paper holding spring.	● Replace the paper holding spring.
6. The paper feeding motor is faulty.	B	● CAUSE 1 to 5 have been checked, but none pertain to the trouble.	● Replace the paper feeding motor.

3) SYMPTOM: No printing is performed

STATUS: Despite normal operation of the motor and carriage, no printing is performed.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. An FPC common lead of the head unit is broken or the connection of the connector section is faulty.	B	● Check both the FPC common leads of the head unit and the conductivity of the connector section.	● Replace the head unit.
2. The ink cartridge unit is improperly installed.	A	● Check if the ink cartridge unit is properly and securely installed.	● Properly re-install the ink cartridge unit.
3. The platen gap is incorrectly adjusted.	C	● Check if the gap between the head and the platen is the correct distance.	● Readjust the platen gap.
4. The head unit is improperly installed.	A	● Check if the head unit is properly and securely installed.	● Properly re-install the head unit.
5. The ink of the head unit has dried up.	A	● Install a new ink cartridge unit, plot a few lines and check if normal printing is restored.	● Perform recovery using the recovery cartridge.

4) SYMPTOM: Head unit does not stop at home position

STATUS: When the printer is powered, the head unit moves in the positive x-axis direction but does not stop at home position.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. A lead of the reset detector unit is broken or the conductivity to the connector section is faulty.	B	● Referring to Fig. 2-9 (page 16), check both the input voltage between the terminals of the reset detector and the conductivity to the connector section.	● Replace the reset detector unit.
2. The contact of a reset detector terminal is faulty due to dirt, lint or deformation.	B	● Check the conductivity between reset detector terminals.	● Clean the reset detector terminals or replace the reset decector.

5) SYMPTOM: A specific color is not printed

STATUS: Despite normal operation of the motor and carriage, a specific color is not printed or plotting is faint.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. An FPC lead is broken.	B	● Referring to Fig. 2-8 (Page 16), check the conductivity between the pertinent head coil terminals.	● Replace the head unit.
2. A head coil lead is broken.	B	● Check the conductivity between the pertinent head coil terminals.	● Replace the head unit.
3. The ink supply has run out.	A	● Plot a few lines to check if the darkness of the plotting returns to normal.	● Replace the ink cartridge unit.
4. The ink supply is stopped up.	A	● Check if paper dust or other particles have collected on the ink adhesion guide section of the head unit.	● Mount the recovery cartridge on the head unit, then perform printing until printing returns to normal.
5. The ink of the head unit has dried up.	A	● Inslall a new ink cartridge unit, plot a few lines and check if normal printing is restored.	● Perform recovery using the recovery cartridge.

6) SYMPTOM: Missing dots

STATUS: There are missing dots within the plotted image.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. The power supply input to a dot head is abnormal.	B	● Referring to Fig. 2-8 (Page 16), check the conduction pulsewidth, voltage, and cycle of the pertinent dot head.	● Replace the head unit.
2. The platen gap is incorrectly adjusted.	C	● Check if the gap between the head and platen is the correct distance.	● Re-adjust the platen gap.
3. A head wire is worn or damaged.	B	● Perform a visual check of the pertinent head wire.	● Replace the head unit.
4. The ink supply has run out.	A	● Plot a few lines and check if normal printing is restored.	● Replace the ink cartridge unit.

7) SYMPTOM: Imperfectly formed characters

STATUS: Plotted images or characters are disorderly and deformed.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
The power supply input to the carriage motor or paper feeding motor is faulty.	B	● Referring to Fig. 2-9 (Page 16), check the input voltage, conduction pulsewidth, and cycle.	● Check the input side of the power supply and perform repair.

8) SYMPTOM: Running together of ink colors

STATUS: Several ink colors become mixed together so that the tonality of the plotting is not clear.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. Ink colors have adhered to the ink adhesion guide section of colors others than their own.	A	● Perform a visual check of the ink adhesion guides of the head unit.	● Using a soft cloth or paper that is moistened with water, wipe off the ink adhesion guide sections and their periphery.

9) SYMPTOM: Ink stains on paper

STATUS: The paper is stained with ink outside of the printing range.

CAUSE	LEVEL	CHECK POINT & METHOD	REPAIR METHOD
1. Ink has adhered to the paper guide or other part.	A	● Perform a visual check of the paper guide and its periphery.	● Wipe off the adhered ink with a soft cloth or remove it using the cleaning sheet.

3.1 DISASSEMBLY

This printer is disassembled using the same procedures described in section 3.2, "ASSEMBLY," performed in the reverse sequence.

By referring to the contents of the ASSEMBLY DETAILS column while performing disassembly, you can confirm the installation method of components and other details, thereby simplifying the following assembly process. During disassembly, the checks and adjustments that are indicated in the ASSEMBLY STEP column by a star (★) may be disregarded.

3.2 ASSEMBLY

When performing assembly, refer to PARTS GUIDE at the back of the manual to confirm the shape of components and their mounting position.

The instructions preceded by a star (★) in the ASSEMBLY STEP indicate a required check or adjustment. See section "ADJUSTMENT," regarding detailed descriptions for performing each adjustment. After disassembly has been performed, check for the presence/absence of the pertinent adjustment point during the following assembly process.

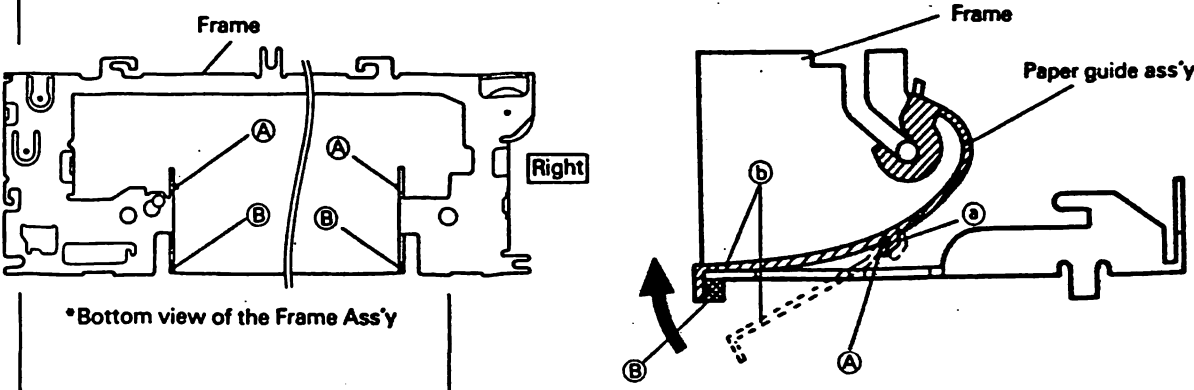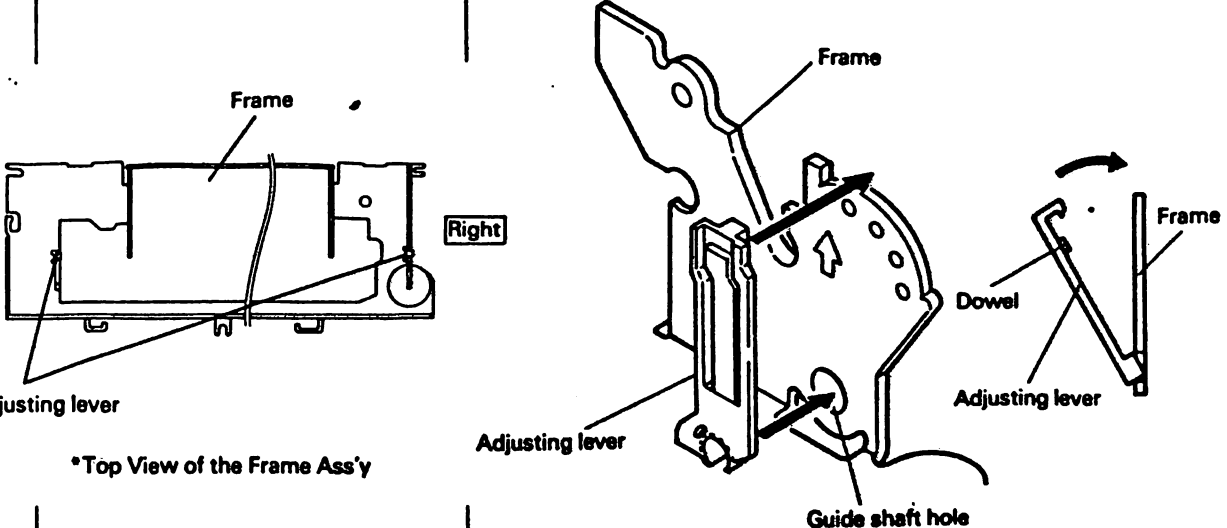Small parts are represented by abbreviated designations as follows:

CP: Cross-recessed head machine screw (Pan head)
RE: Retaining ring Type E
OW: Outside-toothed lock washer
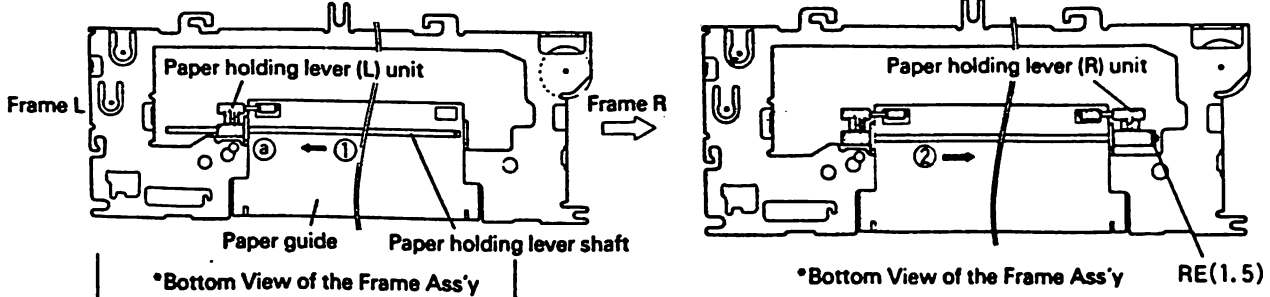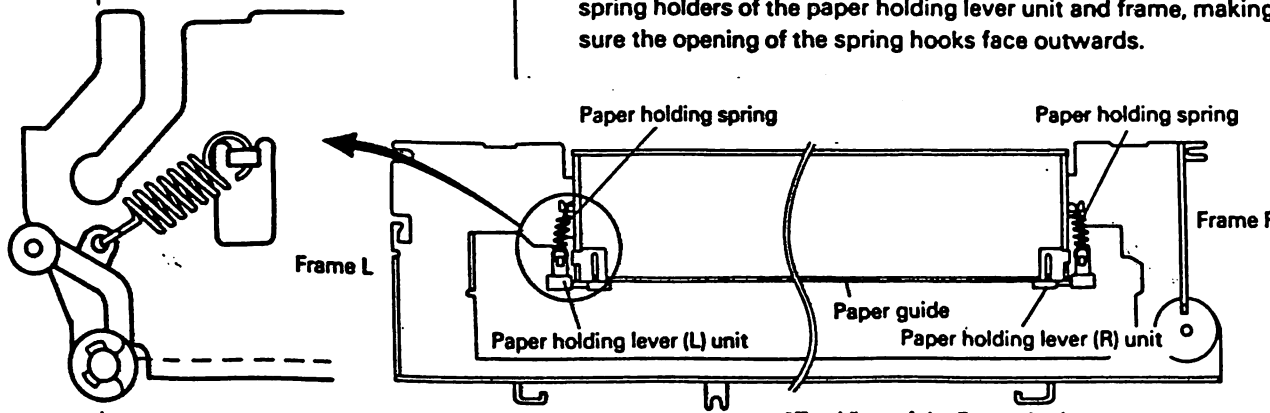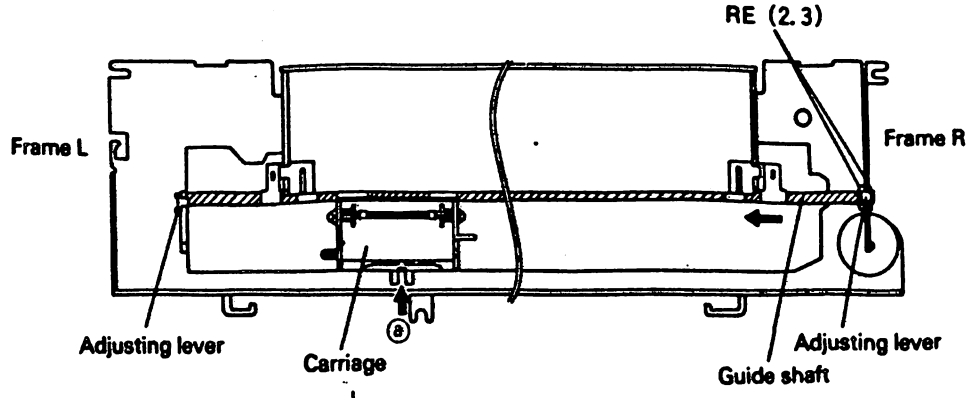
3.2.1 Assembly Block

Assembly Block A | **Paper Feeding Mechanism**
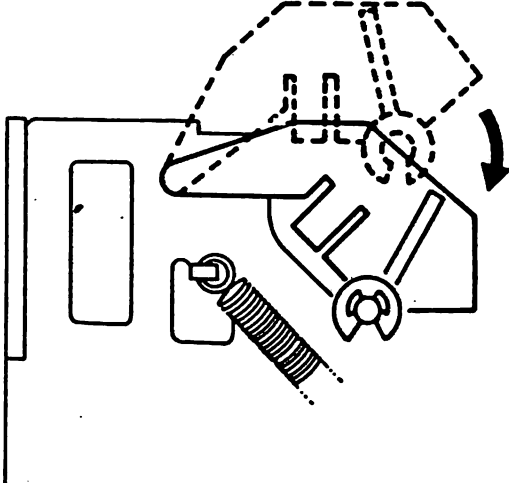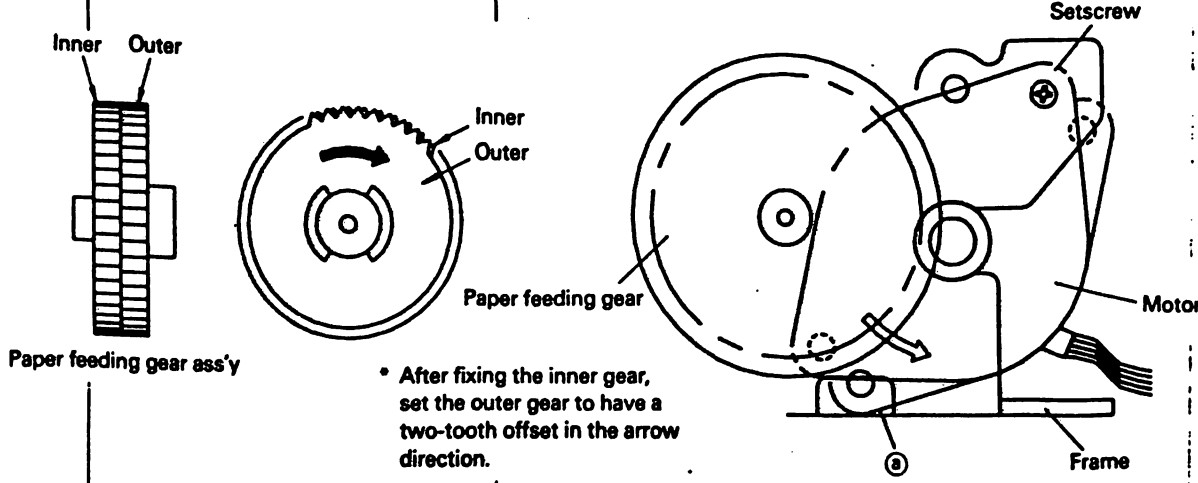
ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
1	Frame ass'y	
2	Paper guide ass'y	● Mount the hook sections Ⓑ of the paper guide ass'y on the dowels Ⓐ on the inside of frames R and L, rotate the paper guide ass'y in the arrow direction using the dowels as the fulcrum, then mount the notches ⓑ of the paper guide ass'y onto the hooked sections Ⓑ of the frame. At this time, the claw of the paper guide ass'y is set on the stepped section Ⓑ of the frame.

*Bottom view of the Frame Ass'y

| 3 | Adjusting lever | ● Push the cylindrical section of the adjusting lever from the left (inner) side into the guide shaft hole of frame R, then use the cylindrical section as the fulcrum to press the adjusting lever in the arrow direction and fit it onto frame by the upper part of the lever (the part shaped like "⊐"). Use the same procedure for mounting the frame L side from the left (outer) side. At this time, make sure that both dowels of the adjusting lever are inserted as deeply as possible (indicated by ⇧) into the dowel holes of the frame. |

*Top View of the Frame Ass'y

ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
4	Paper holding lever shaft	● Insert the paper holding lever shaft (the side without the RE hole) into the shaft hole ⓐ of frame L from the arrow direction ①. At the same time, mount the paper holding lever (L) unit. Next, insert side R (the side with the RE hole) of the paper holding lever shaft into the shaft hole of frame R from the arrow direction ②, mounting the paper holding lever (R) unit in a similar manner. After completing the above operation, mount the type-E retaining ring (RE) on the right side of the paper holding lever shaft then tighten the ring.
5	Paper holding lever (L) and (R) units RE (1.5) × 1	

Frame L — Paper holding lever (L) unit — ⓐ — ← ① — Frame R

Paper guide — Paper holding lever shaft

Paper holding lever (R) unit — ② →

*Bottom View of the Frame Ass'y

*Bottom View of the Frame Ass'y   RE(1.5)

| 6 | Paper holding lever spring   × 2 | ● Mount the L and R paper holding springs between the respective spring holders of the paper holding lever unit and frame, making sure the opening of the spring hooks face outwards. |

Frame L

Paper holding spring — Paper holding spring

Frame R

Paper holding lever (L) unit — Paper guide — Paper holding lever (R) unit

*Top View of the Frame Ass'y

| 7 | Guide shaft | ● Insert the guide shaft (the side without the RE hole) from the guide shaft hole of frame R, pass it throught the carriage shaft hole, then insert it into the guide shaft hole of the frame. At this time, the protuberance (section ⓑ) of the back section of the carriage projects outside the frame. After completing the above operation, tighten the retaining ring (RE) so that the adjusting lever is caught between the inner and outer sides of frame R. |
| 8 | Carriage unit RE (2.3)   × 2 | |

RE (2.3)

Frame L — Frame R

Adjusting lever — Carriage — Guide shaft — Adjusting lever

ⓑ

ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
9	Platen unit	● Mount the platen shaft holder onto the left side of the platen unit, then pass the platen shaft through section ⑧ of the frame L shaft holder. (Do not set the shaft holder onto the frame at this time.)
10	Plate shaft holder	● With the platen shaft holder of the platen unit pressed in the arrow direction (←), insert the platen unit along the opening ⑥ of frame R.
		● When insertion is completed, mount the platen shaft holder R onto frame R then mount platen shaft holder L onto frame L, being careful not to damage the paper feeding claw.

*Top View of the Frame Ass'y

ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
12	Paper guide holder (R) and (L) RE (2.0)	● Insert the dowel of the paper guide holder into the hole in the frame. Then, using the dowel as a fulcrum, rotate the paper guide holder as shown in the diagram, and fasten it to the platen unit shaft by inserting the E retaining ring into the groove in the platen unit shaft to the left of the paper guide holder.
13	Peper feeding motor CP (2 × 4) × 1 OW-2 × 1	● Set the outer gear of the paper feeding gear ass'y (two-gear configuration) to have a two-tooth offset in the clockwise direction, engage it with the motor gear, then tighten the screw of the motor. To mount the motor, rotate the motor in the arrow direction after inserting the motor shaft holder section into the slot of the frame, catch it onto section ⓐ of the frame, then secure it by tightening the setscrew.
★	Adjustment of gear backlash	

Inner   Outer

Inner
Outer

Paper feeding gear ass'y

* After fixing the inner gear, set the outer gear to have a two-tooth offset in the arrow direction.

Setscrew

Paper feeding gear

Motor

ⓐ
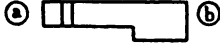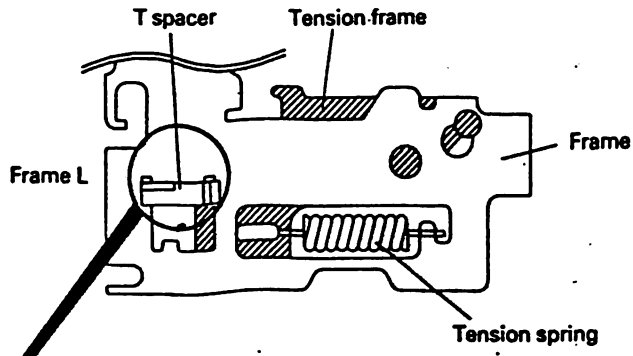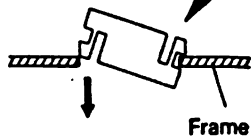
Frame

3.2.2 Assembly Block

Assembly Block B	Carriage Feeding Mechanism

ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
1	Tension frame ass'y	
2	Wire drum ass'y	● Mount the wire drum assy onto the wire drum shaft of the tension frame ass'y, then secure the retaining ring (RE).
	RE (2.0) × 1	
3	Carriage motor	● Mount and secure the carriage motor using the same method as for the paper feeding motor, setting the outer gear of the wire drum ass'y (two-gear configuration) to have a two-teeth offset in the clockwise direction.
	CP (2 × 4) × 1	
	OW-2 × 1	
★	Adjustment of wire drum ass'y	
4	Wire	● Using tweezers or a standard screwdriver, respectively insert the fixed ® and ⓛ sections of the carriage wire into the right and left sides of the wire drum ass'y.
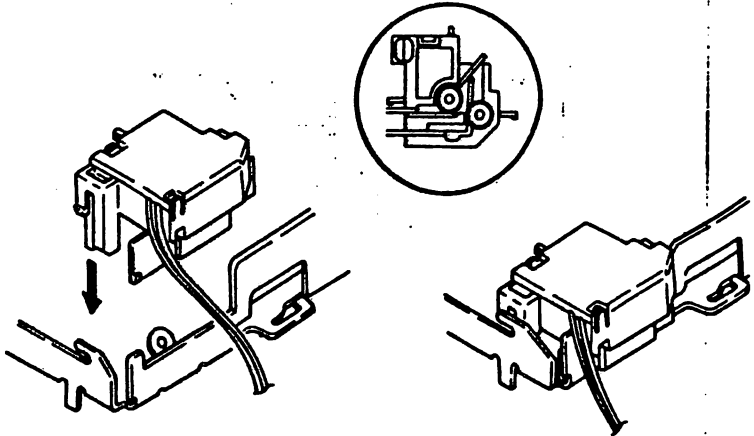
- After completing Steps 1-4 above, insert the protuberance ⓑ of the tension frame into hole ⓐ on frame L, then press in the arrow direction
- Attach wire ® onto both the idle pulley ⓐ and return pulley, then attach the hook section of the wire onto the dowel on the right side of the carriage.
- In the above status, move the carriage to the left side, rotate the wire drum in the arrow direction after wire ® becomes taut, the take up wire ®.
- At the moment the carriage is in its rightmost position, wrap wire ⓛ halfway around the wire drum, catch it on the idle pulley ⓑ then attach the hook of wire ⓛ onto the dowel on the left side of the carriage.

ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
5	Tension spring	● Mount the tension spring onto the hook sections of the tension frame and frame, then mount the T spacer. (The setting directions of sections ⓐ and ⓑ of the T spacer vary with the amount of clearance between the frame and tension frame.)
6	T spacer	 • Bottom View of the Frame Ass'y ● Mount the T spacer so that its wider claw is positioned towards the bottom side of the printer. • Bottom View of the Frame Ass'y

3.2.3 Assembly Block
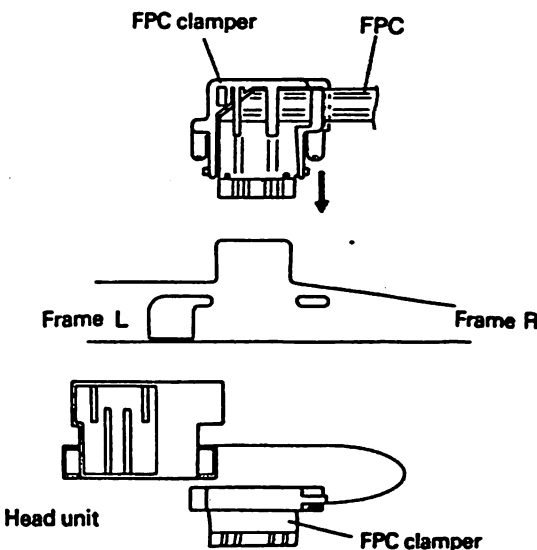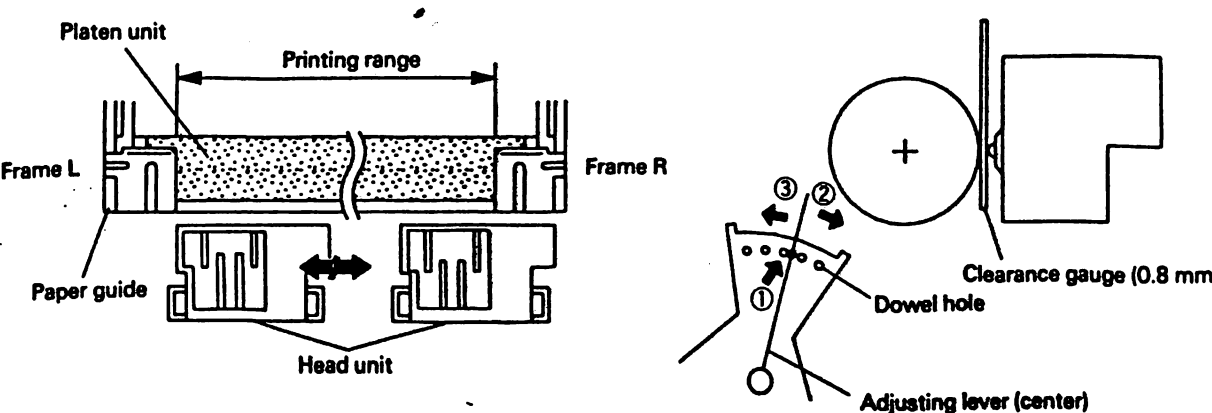
Assembly Block C	Reset Detector Mechanism
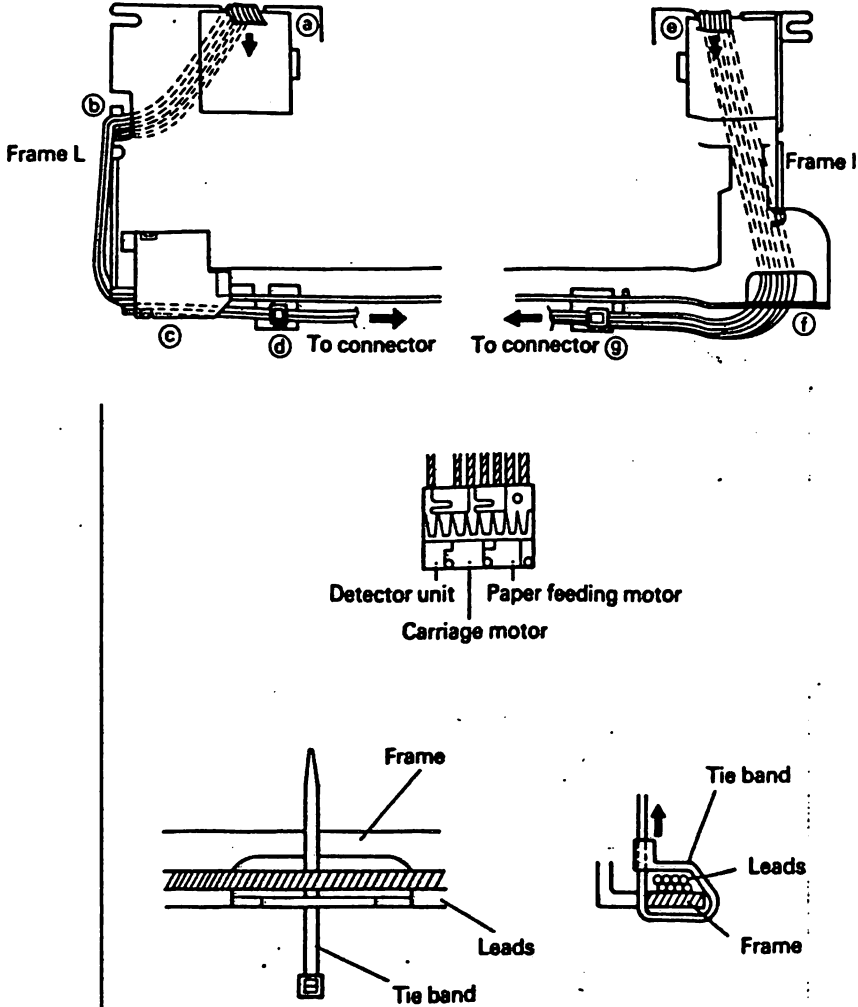
ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
1	Reset detector unit	● Mount the reset detector unit into the slot onto the side of frame L.

3.2.4 Assembly Block

| Assembly Block D | Head Mechanism |

ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
1	Head unit	● After mounting the head unit onto the carriage unit as shown in the figure below, mount the FPC clamper onto the frame.
★	Platen gap adjustment	● Move the carriage to the leftmost position (of the printing range) on the platen, then remove the left side of the adjusting lever from the dowel hole. In this status, insert an 0.8 mm clearance gauge between the dot wire exit section and platen. Move the adjusting lever forward, then move it backward when there is no longer a gap, setting the dowel of the adjusting lever into the first corresponding dowel hole.

FPC clamper   FPC

Frame L   Frame R

Head unit   FPC clamper

● Next, move the carriage to its rightmost position then adjust the platen gap on the right side using the same procedure.
The platen gaps must be of equal distance on both sides. After completing both adjustments, therefore, the carriage should be moved to the right and left to confirm that the platen gaps are equal.

Platen unit

Printing range

Frame L   Frame R

Paper guide

Head unit

Clearance gauge (0.8 mm)

Dowel hole

Adjusting lever (center)

① Removal from dowel hole
② Adjustment
③ Fixing

ASSEMBLY STEP	PART NAME	ASSEMBLY DETAIL
2	Leads	● The leads of the carriage motor are set in the following sequence: slot ⓐ of the frame → slot ⓑ of the frame → below the overhanging section ⓒ of the reset detector → tie band ⓓ of the frame. Note that the leads of the reset detector are converged with the motor leads from the overhanging section of the reset detector. After completing the above, pass the tie band from the bottom of section ⓓ and fasten it temporarily. Next, arrange the leads into equal lengths, securely fasten the tie band, then cut off the unnecessary portion of the tie band with nippers or its equivalent. ● The leads of the paper feeding motor are set in the following sequence: frame slot ⓔ → frame slot ⓕ → tie band ⓖ of the frame. Similar to the above, temporarily tie the tie band, complete the connection procedure, arrange the leads into equal lengths, securely fasten the tie band, the cut off the unnecessary portion of the tie band with nippers or its equivalent. Frame L Frame I ⓒ ⓓ To connector To connector ⓖ Detector unit | Paper feeding motor Carriage motor Frame Leads Tie band Tie band Leads Frame

■ PARTS LIST & GUIDE

1 Main PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	PZETL1161CCZZ	AA		B	Insulator sheet
2	QCNCM00NSSC16	AF		C	Connector (16pin)
3	QCNCW1270CC0F	AC		C	Connector to LCD (6pin)
4	QCNCM1338CC0B	AA		B	Connector (2pin)
5	QCNCW1368CC1E	AM		C	Connector (15pin)
6	QCNW-1326CCZZ	AF	N	C	FPC (20pin)
7	RC-KZ1054CCZZ	AB	N	C	Capacitor (50WV 0.1μF)
8	RCRSP0006MCZZ	AD		B	Crystal (4MHz)
9	RFiLN1008CCZZ	AH		C	Filter (ESD-H-14B)
10	RMPTC4104QCKJ	AC		B	Block resistor (100KΩ×4 1/16W ±10%)
11	RMPTC4564QCKJ	AB		B	Block resistor (560KΩ×4 1/16W ±10%)
12	RMPTC5104QCKJ	AC		B	Block resistor (100KΩ×5 1/16W ±10%)
13	RVR-MA510QCN1	AD		B	Variable resistor
14	RVR-MB410QCZZ	AD		B	Variable resistor (22KΩ)
15	VCCCPU1HH300J	AA		C	Capacitor (50WV 30pF)
16	VCEAGU1AW227M	AB		C	Capacitor (10WV 220μF)
17	VCEAGU1CW226M	AA		C	Capacitor (16WV 22μF)
18	VCEAGU1HW105M	AA		C	Capacitor (50WV 1.0μF)
19	VCEAGU1HW335M	AA		C	Capacitor (50WV 3.3μF)
20	VCKYPU1HB472K	AA		C	Capacitor (50WV 4700pF)
21	VHDDS1588L2-1	AB		B	Diode (1S1588L2)
22	VHD10E1N///-1	AB		B	Diode (10E1)
23	VHD11DQ03///-1	AE		B	Diode (11DQ03)
24	VHEHZ11B1//-1	AB		B	Zener diode (HZ11B1)
25	VHEHZ4CLL//-1	AE		B	Zener diode (3.4-3.8V)
26	VHEHZ6A1///-1	AB		B	Zener diode (HZ6A1)
27	VHiBA6251//-1	AF	N	B	IC (BA6251)
28	VHiLB1247//-1	AM		B	IC (LB1247)
29	VHiSC6305Y39P	BA	N	B	IC (SC6305Y39P)
30	VHiSTA401A/-F	AL	N	B	IC (STA401A)
31	VHiTC40H367P1	AH		B	IC (TC40H367P1)
32	VHiTC4001BP-1	AF		B	IC (TC4001BP)
33	VHiTC4081BP-1	AE		B	IC (TC4081BP)
34	VHiTC74HC02P1	AE	N	B	IC (TC74HC02P1)
35	VRD-ST2EY100J	AA		C	Resistor (1/4W 10Ω ±5%)
36	VRD-ST2EY103J	AA		C	Resistor (1/4W 10KΩ ±5%)
37	VRD-ST2EY104J	AA		C	Resistor (1/4W 100KΩ ±5%)
38	VRD-ST2EY151J	AA		C	Resistor (1/4W 150Ω ±5%)
39	VRD-ST2EY152J	AA		C	Resistor (1/4W 1.5KΩ ±5%)
40	VRD-ST2EY154J	AA		C	Resistor (1/4W 150KΩ ±5%)
41	VRD-ST2EY184J	AA		C	Resistor (1/4W 180KΩ ±5%)
42	VRD-ST2EY220J	AA		C	Resistor (1/4W 22Ω ±5%)
43	VRD-ST2EY224J	AA		C	Resistor (1/4W 220KΩ ±5%)
44	VRD-ST2EY271J	AA		C	Resistor (1/4W 270Ω ±5%)
45	VRD-ST2EY331J	AA		C	Resistor (1/4W 330Ω ±5%)
46	VRD-ST2EY394J	AA		C	Resistor (1/4W 390KΩ ±5%)
47	VRD-ST2EY561J	AA		C	Resistor (1/4W 560Ω ±5%)
48	VRD-ST2EY564J	AA		C	Resistor (1/4W 560KΩ ±5%)
49	VRD-ST2EY821J	AA		C	Resistor (1/4W 820Ω ±5%)
50	VRD-ST2EY823J	AA		C	Resistor (1/4W 82KΩ ±5%)
51	VRD-ST2HY1R4J	AA		C	Resistor (1/2W 1.4Ω ±5%)
52	VRD-ST2HY180J	AA		C	Resistor (1/2W 18Ω ±5%)
53	VSDTA144-//-1	AC		B	Transistor (DTA144)
54	VSJC501-P//QC	AB		B	Transistor (JC501-P//QC)
55	VS2SA1286-/-1	AD		B	Transistor (2SA1286)
56	VS2SA473-O/YC	AG		B	Transistor (2SA473-O/YC)
57	VS2SA937-//-1	AB		B	Transistor (2SA937)
58	VS2SC2021-RSC	AF		B	Transistor (2SC2021-RSC)
59	VS2SD1227MR-1	AD		B	Transistor (2SD1227MR)
	(Unit)				
901	DUNTK8626CCZZ	BT	N	E	Main PWB unit

Do not sale !

2 Exteriors

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	GCOVA1427CC01	A D	N	B	Paper cover
2	HPNLH1054CCZZ	A E	N	D	Instruction panel
3	CCOVA1426CC02	A G	N	D	Printer cover
4	GFTAS1282CC03	A B	N	D	Connector cover
5	TCAUK1198CCZZ	A A		C	Caution card for 11pin connector rubber cap
6	PHOG-1093CCZZ	A B		C	Rubber cap for 11pin connector cable
7	JKNBZ1978CC01	A B	N	C	Volume knob
8	TLABB2271CC01	A B	N	C	Model label
9	DUNTK8627CCZZ	B A	N	E	Key PWB unit
10	QCNW-1326CCZZ	A F	N	C	FPC (20pin)
11	PSLDC1510CCZZ	A E	N	C	Sheild plate
12	PTPEH1309CCZZ	A D	N	C	Tape
13	GCABB2860CC01	A P	N	D	Top cabinet
14	JKNBZ1808CC02	A G	N	C	Key top (ink) (30pcs/set)
15	JKNBZ1808CC01	A G		C	Key top (P.F) (30pcs/set)
16	PGUMM1610CCZZ	A B	N	C	Rubber spring
17	NROLR1041CCZZ	A C	N	C	Vorume roller
18	LX-WZ1015CCZZ	A A		C	Washer
19	LX-BZ1145CCZZ	A A		C	Screw
20	JKNBZ1411CCZZ	A B		C	Mode switch knob
21	QCNTM1042CCZZ	A A		C	Slide switch terminal
22	LX-BZ1195CCZZ	A A	N	C	Screw
23	GLEGG1034CCZZ	A A	N	C	Printer rubber
24	Ki-OB1025CCZZ	B W	N	E	Printer unit (M-3740)
25	DUNTK8626CCZZ	B T	N	E	Main PWB unit
26	GLEGP1009CCZZ	A A		C	Rubber foot
27	GCABA2859CC01	A N	N	D	Bottom cabinet
28	GFTAA1287CC08	A B	N	D	Connector cover
29	PTPEH1294CCZZ	A A		C	Tape
30	PSLDC1509CCZZ	A F	N	C	Sheild plate
31	QCNCW1390CC01	A C		B	Connector (2pin with wire)
32	UBATN2225CCZZ	A Y	N	S	Battery (500MAH)
33	PCUSG1139CCZZ	A A		C	Cushion
34	LFiX-1211CCZZ	A D	N	C	Battery fixing plate
35	XUBSD20P06000	A A		C	Screw (2×6)
36	XUBSF26P08000	A A		C	Screw (2.6×8)
37	QJAKC1003CCZZ	A D		B	Jack (for AC adaptor)
38	QSW-Z2080SCZZ	A H		B	Switch (SDJ-1S)

3 Key PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	PSLDC1510CCZZ	A E	N	C	Shield plate
2	QCNCM1367CC1E	A K		C	Connector (15pin)
3	RC-KZ1054CCZZ	A B	N	C	Capacitor (50WV 0.1μF)
4	VCEAGU1HW105M	A A		C	Capacitor (50WV 1.0μF)
5	VHDDS1588L2-1	A B		B	Diode (1S1588L2)
6	VHPGL3AR2///1	A D		B	LED (GL3AR2)
7	VRD-ST2EY102J	A A		C	Resistor (1/4W 1KΩ ±5%)
8	VRD-ST2EY103J	A A		C	Resistor (1/4W 10KΩ ±5%)
9	VSJA101-P//QC	A B		B	Transistor (JA101-P//QC)
	(Unit)				
901	DUNTK8627CCZZ	B A	N	E	Key PWB unit

4 Packing material and Accessories

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
	CADPA1013CC01	B G		C	AC adapter (EA150)(SM)
	DUNT-6452CC03	B E		C	AC adapter (EA150)(USA,CANADA,SD)
	DUNT-6453CC03	B F		C	AC adapter (EA150)(MA)
	DUNT-6454CC03	B F		C	AC adapter (EA150)(MB)
1	DUNT-6455CC03	B D		C	AC adapter (EA150)(MV)
	DUNT-6457CC03	B F		C	AC adapter (EA150)(SB,SC)
	DUNT-6461CC03	B F		C	AC adapter (EA150)(SH)
	DUNT-6462CC03	B F		C	AC adapter (EA150)(SK)
	DUNT-6553CC03	B F		C	AC adapter (EA150)(SN)
2	QPLGA1012CCZZ	A F		C	Plug conversion adaptor (SB,SC)
3	TiNSE4459CCZZ	A N	N	D	Instruction book (English)
	TiNSM4460CCZZ	A X	N	D	Instruction book (E,F,G,S,I)
4	NSFTZ1078CCZZ	A G		C	Roll shaft
5	TCAUK1191CCZZ	A A		D	Caution card
6	UBAGZ1439CC01	A W	N	D	Book type case
9	SPAKA420ACCZZ	A G	N	D	Packing cushion for set
10	SPAKC424ACCZZ	A K	N	D	Packing case

4 AC adaptor

	Voltage (V)	Type of plug	Country
MA	240	Square (NSW) 3-pin	Australia, New Zealand, Fiji
MB	240	BS 3-pin	England
MV	220	Round (SEV) 2-pin	Germany, Finland, Sweden, Norway, Denmark, Switzerland(SEV)
SA	100	Flat 2-P	Japan, Korea
SB	110/220	Round 2-p	Rumania, Spain, Turkey, U.S.S.R, Yugoslavia, Argentina, (Bolivia), (Brazil), Austria, Belgium, Bulgaria, Czechoslovakia, France, Chile, Paraguay, Peru, Uruguay, French Guiana, Guadeloupe, Greece, Netherlands, Hungary, Iceland, Italy, Poland, Portugal, Afghanistan, Thailand, Burme, India, Indonesia, Iran, Iraq, Jordan, (Lebanon), Nepal, Pakistan, Qatar, Algeria, Dahomey, Ethiopia, Ghana, Republic of the Ivory Coast, (Cameroun), Kenya, Malawi, Mali, Rwanda, (Sengal), Sudan, Togo, Tunisia, Yemen, Canary Island, Bangladesh, Mozambique, Libya, Congo, Angola, The United Arab Emirates, S.R. of Viet Nam, Cyprus, Gibralter, Malta, Nigeria, Mauritius, Sierra Leone
SC	110/220	Flat 2-p	Taiwan, Jamaica, Liberia, (Guam), Philippines, Honduras
SD	120	Flat 2-p	Republic of Panama, El Salvador, Trinidad and Tobago, Colombia, Nicaragua, Venezela, Mexico, Bermuda, Costa-Rica, Dominica, Ecuador, Guyana, Guatemala, Barbados.
SE	200	Round 3-p	Hong Kong
SH	220	Round 2-P	Republic of South Africa
SK	240	Round 2-p	Kuwait, Tanzania, Zambia, Uganda, Syria
SM	240	Square 3-p	Singapore, Malaysia
SN	127/220	Round 2-p	Saudi Arabia
U.S.A	120	Flat 2-p	U.S.A
CANADA	120	Flat 2-p	CANADA

5 Printer unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
401	00BC850001000	AW	N	C	Main frame ass'y
402	00BC850002010	AE	N	C	Adjusting lever
403	00BC850002070	AE	N	C	Earth wire S1
404	00BC850002050	AC	N	C	T spacer
405	00BC850002080	AE	N	C	Earth wire S2
406	00BC850054000	BD	N	C	Paper feeding motor ass'y 2 (EPM-2003)
407	00BC850055000	BD	N	C	Carrage motor ass'y 2 (EPM-2006)
408	00BC850052010	AD	N	C	Motor gear
409	00BB010101311	AB		C	C.P.Screw (M2×4)
410	00BB090600512	AA	N	C	Washer
411	00BA279950016	AB	N	C	Tie band
412	00BC850101000	AK	N	C	Tension frame ass'y
413	00BC850102010	AC	N	C	Tension spring
414	00BC850103000	AH	N	C	Wire drum ass'y
415	00BB150300411	AA		C	Retaining Ring TYPE-E (2)
416	00BC850104010	AQ	N	C	Wire
417	00BC850201000	AR	N	C	Carriage unit
420	00BC85.0203010	AK	N	C	Guide shaft
421	00BB150350111	AA		C	Retaining Ring TYPE-E (2.3)
422	00BC850251000	AU	N	C	Paper guide ass'y
424	00BC850263010	AE	N	C	Paper guide holder L
425	00BC850264010	AE	N	C	Paper guide holder R
426	00BC850252000	AL	N	C	Paper holding lever (L) unit
427	00BC850255010	AC	N	C	Paper holding spring
●	00BC850255020	AE	N	C	Paper holding lever shaft
	00BC850256000	AL	N	C	Paper holding lever (R) unit
431	00BB150300311	AA		C	Retaining ring type-E (1.5)
432	00BC850258000	AX	N	B	Platen unit
433	00BC850258010	AC	N	C	Platen shaft holder
435	00BC850151000	AP	N	B	Reset sencer unit
440	00BF407100000	BQ	N	B	Head unit
	(Unit)				
901	Ki-0B1025CCZZ	BW	N	E	Printer unit (M-3740)

Do not sale !

CE—140P

SHARP

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125 - 171285/106002000